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THIRTY-SIXTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF MICHIGAN

FOR THE

FISCAL YEAR ENDING JUNE 30, 1908

BY AUTHORITY

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OFFICE OF THE
SECRETARY OF THE STATE BOARD OF HEALTH.
LANSING, MICHIGAN, DECEMBER, 1908.

TO HON. FRED M. WARNER, *Governor of Michigan:*

SIR:—In compliance with the laws of this State, I present to you the accompanying report for the fiscal year ending June 30, 1908.

Very respectfully,
FRANK W. SHUMWAY,
Secretary of the State Board of Health.

MEMBERS

OF THE

MICHIGAN STATE BOARD OF HEALTH.

NAME.	POSTOFFICE ADDRESS.	TERM EXPIRES.
Charles M. Ranger, A. B.	Battle Creek	January 31, 1909.
Hon. Coleman C. Vaughan	St. Johns	January 31, 1909.
Angus McLean, M. D.	Detroit	January 31, 1911.
Malcolm C. Sinclair, M. D.	Grand Rapids	January 31, 1911.
Frank W. Shumway, M. D.	Lansing	March 30, 1911.
Victor C. Vaughan, M. D., Ph. D.	Ann Arbor	January 31, 1913.
Aaron R. Wheeler, M. D.	St. Louis	January 31, 1913.

PRESIDENT.

Angus McLean, M. D.

VICE-PRESIDENT.

Malcolm C. Sinclair, M. D.

SECRETARY AND EXECUTIVE OFFICER.

Frank W. Shumway, M. D.

CONTENTS.

Page.

Title page ... 1

Letter of transmittal to Governor Warner ... 3

Members of the State Board of Health ... 5

Contents ... 7

Regular and Special meetings of the Board, fiscal year, 1907 ... 9–12

Examination of plans for State buildings ... 13–28

Examination and licensing of embalmers ... 28–29

General and special work, and expenditures, in the office of the Secretary, fiscal year 1908 ... 30–82

Michigan State Sanatorium for the treatment of incipient tuberculosis ... 82–86

Michigan Association for the prevention and relief of tuberculosis ... 86

Communicable diseases in Michigan during 1907, and in preceding years ... 87–215
- Introduction ... 87–88
- Physicians' report of dangerous communicable diseases ... 89
- Pneumonia ... 90–105
- Tuberculosis ... 106–121
- Meningitis ... 121–131
- Typhoid fever ... 131–147
- Diphtheria ... 147–160
- Whooping-cough ... 161–166
- Scarlet fever ... 167–178
- Measles ... 178–194
- Smallpox ... 194–208
- Chicken-pox (Varicella) ... 209
- Mumps (Parotitis) ... 209
- Erysipelas ... 209
- Puerperal fever ... 210
- Itch (Scabies) ... 210
- Tetanus (Lock-jaw) ... 210–211
- Dysentery ... 211
- Diseases of animals, dangerous to man, in Michigan, in 1907 ... 211–215
  - Anthrax ... 211
  - Glanders (Farcy) ... 211
  - Rabies (Hydrophobia) ... 212–215

Alleged nuisances in Michigan in 1907 ... 215–216

PART I.

REGULAR AND SPECIAL MEETINGS OF THE STATE BOARD OF HEALTH, FISCAL YEAR, 1907.

BRIEF EXTRACTS FROM THE PROCEEDINGS.

REGULAR MEETING, HELD AT LANSING, JULY 12, 1907.

The members present were: President Angus McLean, M. D., Detroit; Vice-President Malcolm C. Sinclair, M. D., Grand Rapids; Aaron R. Wheeler, M. D., St. Louis; C. M. Ranger, A. B., Battle Creek; Hon. C. C. Vaughan, St. Johns; Victor C. Vaughan, M. D., Ann Arbor, and F. W. Shumway, M. D., Secretary.

Dr. Shumway, as the delegate of this Board to the meeting of the American Medical Association, at Atlantic City, June 4-7, reported that one of the most important questions considered at that meeting was that of the pollution of our inland lakes and streams, but that, by reason of the length of the program, no discussions were allowed.

The question of the publication of a circular on Sanitary Dry Earth Closets, as a means of arousing local interest in the subject of disposal of excreta, was taken up and considered at some length.

Upon motion, the Secretary was authorized to send the Sanitary Engineer of the Department to any place within the State at any time, where the locality will pay his expenses.

The questions of the selection of an efficient and practical bacteriologist, and the equipment of a bacteriological laboratory, for this Department, were considered at length, but no definite action was taken on the matter at this meeting.

The following resolution, relative to embalmers' examinations, was adopted by the Board:

> "*Resolved*, That when an applicant for an embalmer's license who shall pass successfully the demonstration and oral examination, and shall give evidence in such examination that he is well informed on the practical work of embalming, but shall fail in the written examination, and providing that the general average of the applicant be not more than two per cent below the standard required for passing, the Secretary of this Board, or any member thereof, shall be authorized to summon such applicant for review of his written examination and any further examination he may deem advisable, and if, upon the second examination, the applicant be able to bring his standing to the seventy-five per cent required, then a license may issue."

The question of reciprocity in admission into this State of licensed embalmers from other States came up for discussion, and a letter was read relative to the terms upon which Iowa will reciprocate with other States. Requests were read from embalmers in Ohio and Indiana for reciprocal licenses, but action was deferred until after the Conference of Embalmers, at Norfolk, in October, 1907.

It was the unanimous expression of the Board that Michigan be represented by an exhibit at the International Congress on Tuberculosis, at Washington, D. C., in September and October, 1908, and plans were made for the same at this meeting.

Upon motion, Dr. V. C. Vaughan was asked to represent the Michigan State Board of Health at the International Congress on Tuberculosis, to be held at Vienna, September, 1907.

SPECIAL MEETING, HELD AT LANSING, SEPTEMBER 11, 1907.

The members present were: President Angus McLean, M. D., Vice-President Malcolm C. Sinclair, M. D., Aaron R. Wheeler, M. D., and F. W. Shumway, M. D., Secretary.

The Secretary was requested to draw up rules and regulations governing the work of the Bacteriologist, specifying the manner in which specimens for analysis are to be prepared and shipped to the Department, etc., and present the same to the Board for their consideration.

The Secretary presented a number of applications for Bacteriologist, and the Board instructed the Vice-President and Secretary to go to Chicago and investigate the application and endorsements of Dr. Holm and report at the next regular meeting.

REGULAR MEETING, HELD AT LANSING, OCTOBER 18, 1907.

The members present were: Vice-President Malcolm C. Sinclair, M. D., Hon. C. C. Vaughan, Aaron R. Wheeler, M. D., and F. W. Shumway, M. D., Secretary.

The Secretary interrupted the order of business to obtain the opinion and pleasure of the Board regarding the payment of expenses when the Sanitary Engineer is sent to inspect State institutions, and it was unanimously decided that the expenses be borne by the State institutions in such cases.

Upon motion, Dr. Shumway was elected Treasurer of the State Board of Health for the disposition of the bacteriological fund.

The Secretary was instructed to publish and issue a monthly bulletin on communicable diseases.

The Secretary made a verbal report of his attendance at the Conference of Embalming Boards and Boards of Health, Norfolk, October 11 and 12, 1907, substantially as follows:

Over twenty States were represented, and several papers were read, the two principal subjects, and those which provoked the greatest discussion, being the question of a universal fluid for embalming purposes and the question of reciprocity.

In regard to the question of embalming fluid, the Secretary of this Board stated to the Conference that, inasmuch as the manufacturers of embalming fluids will not disclose their formulas, all such fluids upon the market should be tested and embalmers informed which fluid, or fluids, should be used.

In regard to the question of reciprocity, the Secretary of this Board gave an address on that subject and suggested that the Conference appoint a Committee of Reciprocity, which suggestion was adopted.

As a result of the report of the committee, appointed at a previous meeting to go to Chicago for the purpose of obtaining information relative to the qualifications, etc., of Dr. M. L. Holm, an applicant for the position of Bacteriologist, Dr. Holm was appointed to that position.

REGULAR MEETING, HELD AT LANSING, JANUARY 10, 1908.

The members present were: President Angus McLean, M. D., Vice-President Malcolm C. Sinclair, M. D., Hon. C. C. Vaughan, Charles M. Ranger, A. B., and F. W. Shumway, M. D., Secretary.

The Secretary made an informal report on the allotment of the equipment for the bacteriological laboratory.

The Secretary reported relative to the revision of the pamphlet [120] which is the full instructions of the Department to local health officials, and stated that the new edition would be published under the heading "Public Health," to make it uniform with other publications of the Department in regard to mailing, etc.

The questions of distribution of materials to local health officials for the sending of samples to the laboratory, and of rules governing the sending of such samples, were discussed at some length, and the Secretary asked for more time in which to make rules and regulations respecting the bacteriological laboratory.

REGULAR MEETING, HELD AT LANSING, APRIL 10, 1908.

The members present were: President Angus McLean, M. D., Vice-President Malcolm C. Sinclair, M. D., Charles M. Ranger, A. B., Aaron R. Wheeler, M. D., and F. W. Shumway, M. D., Secretary.

The Secretary was instructed to publish the pamphlets on Tuberculosis, Typhoid Fever, and Diphtheria, in Polish, Swedish, and German, for distribution among the foreign population in the State.

The Secretary brought up the question of annulling a ruling previously made by the Board requiring a rating of 85 per cent before any embalmer is eligible to receive a reciprocal license in Michigan. It was explained that such a standard was greatly in disfavor with the other States, and that the Boards in other States maintained that any licensed embalmer in good standing in their States should receive a reciprocal license upon that basis, so long as the several States had a uniform per cent for passing their applicants. The motion of the previous meeting was reconsidered and the resolution fixing the rate at 85 per cent was rescinded.

The plan of the Secretary to issue placards relative to the danger of promiscuous spitting, for use in factories, stores, depots, and other public buildings, was unanimously approved by the Board.

Dr. V. C. Vaughan and the Secretary of the Board were appointed a committee to prepare an exhibit for the International Congress on Tuberculosis, in Washington.

The plan of revising and reissuing a leaflet on the prevention of infantile diarrheas was unanimously approved.

Rules and Regulations for the Bacteriological Laboratory were adopted as follows:

1. The laboratory shall be known as the Bacteriological Laboratory of the Michigan State Board of Health.

2. The chief object of the laboratory shall be to aid local health officers in the prevention and diagnosis of communicable diseases, and in cases where the examiner be unduly crowded, precedence shall be given to the specimens submitted for diagnosis of communicable diseases.

3. The laboratory shall be open daily from eight to twelve o'clock, A. M., and from one to four o'clock, P. M., except on legal holidays, when it will be open at the discretion of the Bacteriologist, whenever there are specimens from communicable diseases to be examined, or other work requiring immediate attention.

4. Samples of blood, urine, sputum, water, milk, or other substance relating to a contagious disease, sent in by any member of the State Board of Health for analysis, shall receive the same attention as such samples when sent in by a health officer of a local health jurisdiction.

5. All samples for laboratory investigation shall be delivered directly to the laboratory to facilitate prompt reports, to prevent undue decomposition or destruction of samples submitted for examination.

6. All samples submitted to the laboratory for examination not distinctly within the scope of our work as provided by the act pertaining to this laboratory shall be submitted to the Secretary of the State Board of Health for approval before examination is undertaken: Provided, That in case of rapidly deteriorating materials, in the absence of the Secretary the Bacteriologist may, at his discretion, begin such investigation, the report upon same to be sent to the Secretary.

7. All orders pertaining to supplies and equipment for the laboratory must be submitted to the Secretary of the State Board of Health, who shall be sole manager and business director of this laboratory.

8. The laboratory will endeavor to supply to the various local health officers (method of distribution to be determined by the State Board) suitable mailing cases and directions for sending to this laboratory samples of sputum, throat swabs and blood for Widal's test, as well as directions for collecting and sending water samples, etc., and no samples will be examined unless properly collected and accompanied by the necessary information concerning their source. Specimens of diseased tissue will not be examined when sent through the mails unless received in suitable mailing cases.

9. Specimens submitted by local prosecuting attorneys must be accepted by the Secretary of the State Board of Health before material will be received at the laboratory for examination, and in his absence said Secretary shall, whenever he deems advisable, appoint a suitable person to approve said samples before the same be accepted by the Bacteriologist.

10. Bombs, explosives and other dangerous substances will not be examined, unless opened by the parties submitting same.

11. Since an up-to-date library, containing the latest leading books pertaining to laboratory methods, is an absolute essential to every laboratory, the Secretary is authorized to purchase such works as may be recommended from time to time.

12. The Bacteriologist shall, at each regular quarterly meeting of the State Board of Health, submit a detailed report of the work of the preceding quarter of the laboratory to the Board.

SPECIAL MEETING, HELD AT DETROIT, MAY 20-22, 1908.

The members present were: President Angus McLean, M. D., Vice-President Malcolm C. Sinclair, M. D., Charles M. Ranger, A. B., and F. W. Shumway, M. D., Secretary.

The President was appointed a delegate of this Board to attend the meeting of the American Medical Association at Chicago in June, 1908.

The Secretary was appointed a delegate of this Board to attend the meeting of the American Public Health Association at Chicago, June 7-8, 1908.

The time of this meeting was taken up principally in the examination of applicants for embalmer's license.

EXAMINATION OF PLANS FOR STATE BUILDINGS, RELATIVE TO SEWERAGE, VENTILATION AND HEATING, DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

The following are reports upon the examinations of the plans submitted to the Board during the fiscal year, in accordance with Section 2229, Compiled Laws of 1897:

PLANS FOR A PROPOSED NEW CHAPEL AT THE STATE INDUSTRIAL SCHOOL FOR BOYS, LANSING.

In accordance with Section 2229, Compiled Laws of 1897, plans for a proposed new Chapel at the State Industrial School for Boys, Lansing, were examined by the State Board of Health.

The plans were explained by E. A. Bowd, architect of the building.

It is proposed to heat the building by means of two furnaces,—one at the front and one at the rear; and to remove vitiated air from the auditorium by means of two vent flues, extending from the floor to a point above the ridge of the roof, at the east end of the building. Furnace heating for a building of this size will not give as good results as a steam heating plant, but as there is no central heating plant for this institution, and the Chapel will not require to be warmed for more than an hour or two each Sunday, a steam heating plant for the Chapel only would not be advisable. The vent flues shown on the plans will be far too small to secure the necessary changes of air in the auditorium, and it is recommended that they be enlarged sufficiently to ensure at least thirty cubic feet of fresh air per minute for each occupant. It will not be possible, however, to properly ventilate the auditorium by means of natural draft, and it is recommended that a fan be used for forcing fresh warm air into and through the building during the time it may be occupied.

The water service for the toilet rooms and the water in the traps of the plumbing fixtures will be very liable to freeze during cold weather, and will require proper attention.

The water closet planned to be in the furnace room at the rear of the building would not have proper light and ventilation, and should be placed at some point in the front of the building, where it could be lighted by a window, *but not in the furnace room.* Each of the toilet rooms should have a vent shaft, placed on inside walls, and extending to a point above the ridge of the roof. These flues could be carried over in the attic to one main ventilator if so desired. It was stated by the architect that all plumbing fixtures will be back-vented, and the sewer properly ventilated by openings at the grade and roof. The extensions of the soil pipes from the toilet rooms on the second floor could be connected in the attic and thus require but one opening above the roof.

With the exceptions before-mentioned, the plans were approved in so far as this Board is required by law to examine and express an opinion.

PLANS FOR A NEW ADMINISTRATION BUILDING, A NEW SHACK FOR WOMEN, AND A SEWAGE PURIFICATION PLANT, AT THE STATE SANATORIUM FOR TUBERCULOSIS, HOWELL.

In accordance with Section 2229, Compiled Laws of 1897, plans for a new Administration Building, a new Shack for women, and a Sewage Purification Plant, at the State Sanatorium for Tuberculosis, Howell, were examined by the State Board of Health.

The plans were explained by Dr. R. L. Kennedy, the Medical Superintendent, and by C. G. Jewett, the contractor for the heating and sewerage.

ADMINISTRATION BUILDING.

The plans contemplate the heating of this building principally by means of direct-indirect radiation, and the removal of vitiated air by means of vent registers, at the floor levels, in most of the rooms, and by ceiling vents in the corridor of the wing. The several vents are to be connected, by flues, with several main ventilators on the roofs.

In comparison with a well planned system of indirect heating, the direct-indirect method of heating is very inferior, because, as usually designed, it does not furnish a sufficient volume of fresh air of the proper temperature in the very cold weather; is unreliable during the prevalence of high winds; and necessitates the discharge of air into a room at the wrong place to secure the best ventilation.

The ceiling vents in the corridor of the wing would interfere with the proper ventilation of the rooms in the wing, and it is recommended that they be dispensed with and vents provided for this corridor with registers at the floor level.

There is no provision for the ventilation of the Examining Room, and but partial provision for the ventilation of the following rooms:

Dispensary and Waiting Room; Private Dining Room; Matron's Room; Parlor; Main Dining Room; two Toilet rooms adjacent to the Reception Hall, and the Toilet Room of the Doctor's Office.

It is recommended that a fresh-air supply and vent flue be provided for the Examining Room; fresh-air supplies for the Dispensary and Waiting Room, Private Dining Room, and Matron's Room; and vent flues for the Parlor, Main Dining Room, and the three Toilet Rooms before-mentioned.

The location of the two main ventilators over the second floor should be changed so that it will not be necessary to carry the extensions of the vent flues from Bedrooms Nos. 1, 2 and 5 around the brick chimneys in the manner shown on the plans.

The specifications provide for the testing of the sewerage system before the setting of the plumbing fixtures. It is recommended that the entire sewerage system of this building be tested by the smoke test after the fixtures are all connected up.

SHACK.

This building is to accommodate sixteen women patients, and will be similar to the shack for men erected sometime ago.

Provision is made in the plans for heating the Lobby and Locker Room by a large stove, set in the wall between these rooms, but the effectiveness of the stove will be reduced considerably by the ventilator in the ceiling of the Lobby through which the heated air would readily escape. It is recommended that, in winter, the removal of vitiated air from the Lobby be accomplished by vent registers, at the floor level, communicating with vent flues placed in the wall alongside of the vent flues of the Locker Room, and having separate connections with the main ventilators on the roof.

There is no provision for the supply of fresh air to the Lobby and the Locker Room other than what would be accomplished by the opening of doors or windows, and if there is a possibility of these being closed for any length of time, provision should be made for a supply of fresh warmed air by jacketing the stove and conducting fresh air in air-tight metallic tubes, from outside the building to the under side of the stove.

The specifications provide for "Crock drains," which is taken to mean the sewer shown on the plans. It is recommended that every portion of the sewer be of heavy cast iron where it passes under the building and for a distance of at least three feet outside the building.

No provision seems to have been made for the ventilation of the sewer by the usual openings at the grade and roof, and it is recommended that this be done; also that the traps of the several plumbing fixtures be protected against siphonage.

It was understood that the rain water will be discharged into land drains and not into the sewer.

It is recommended that the sewer and connections be tested by the water test before any pipes are covered in, and by the smoke test after the fixtures are all connected up.

SEWAGE PURIFICATION PLANT.

This plant is designed to take care of the sewage of from 150 to 300 persons, and will consist of a single septic tank and filter bed, to be located in a northerly direction from the present buildings. The effluent from the filter bed is to discharge into the small ditch or stream to the north of the new driveway near the northeast part of the grounds, but provision has been made, by a by-pass, for the discharge into the stream of crude sewage and sewage sludge at such times as the plant may be out of commission. The discharge into the stream of crude sewage or sewage sludge would be very objectionable, and it is recommended that the by-pass be not provided, but that whenever necessary, the crude sewage and sewage sludge be discharged onto or into a porous piece of land at some point where it cannot become a nuisance or endanger any water-supply. It is also recommended that the size of the septic tank be temporarily cut down, if found necessary, until the number of inmates shall be equal to the number for which the tank was designed.

In the construction of the sewer from the buildings it would be wise to provide a number of manholes and pipe inspection shafts, so that stoppages could be located and removed without uncovering the sewer. The manholes should be extended a short distance above the ground and have grated covers so that ventilation of the sewer would be thorough and continuous.

With the exceptions before-mentioned, the plans were approved, in so far as this Board is required by law to examine and express an opinion.

PLANS FOR NEW POWER HOUSE AND SERVICE TUNNEL, AT THE MICHIGAN COLLEGE OF MINES, HOUGHTON.

In accordance with Section 2229, Compiled Laws of 1897, plans for a new Power House and Service Tunnel, at the Michigan College of Mines, Houghton, were examined by the State Board of Health.

The plans were explained by Prof. F. W. McNair, President of the College.

The plans contemplate the erection of a new Power House, near to the lake, and a Service Tunnel, extending from the Power House to each of the several buildings of the College, for the steam pipes, electric light and power wires, etc.

It was stated by President McNair that the present arrangement of the heating in the several buildings will not be changed by the new work further than what may be necessary for making the connections with the new steam mains.

It is proposed to install two water closets and a sink, or other fixture for washing hands, in the Power House, but the locations of such fixtures and the sewer into which they will discharge are not shown on the plans. It is recommended that the water closets be located in rooms having at least one outside wall, so that proper light and *summer* ventilation may be secured by means of outside windows. For the ventilation of these rooms in winter, it is recommended that vent flues be provided, the same to be on inside walls and to extend from the floor levels to a point above the roof.

It is proposed to drain the roof of the Power House and the floor of the Surface Tunnel into the sewer, but the proposed method of making the connections with the sewer is not shown on the plans. As any trap which might be used for this purpose would be very likely to become dry at certain times, it is recommended that the connection with the sewer of the rain conductor, surface drain of the Tunnel, surface drain of the Power House (if any), and the sink, be through one common trap. The frequent use of the sink would then keep the trap sealed and flushed.

The general plans for the installation of a new central heating plant for this institution are approved and commended.

PLANS FOR COTTAGE "K" AND FOR A NEW ADMINISTRATION BUILDING, AT THE UPPER PENINSULA HOSPITAL FOR INSANE, NEWBERRY.

In accordance with Section 2229, Compiled Laws of 1897, plans for Cottage "K" and for a new Administration Building, at the Upper Peninsula Hospital for Insane, Newberry, were examined by the State Board of Health.

The plans were explained by Dr. E. H. Campbell, Medical Superintendent and D. Fred Charlton, the architect.

COTTAGE "K."

The plans contemplate the erection of a cottage building substantially the same as other cottages at this institution, plans for which were examined and approved by this Board on March 7, 1900; July 12, 1901; July 17, 1903, and October 13, 1905.

There is no apparent provision for the ventilation of the attendants' room on the second floor, and it is recommended that such provision be made.

ADMINISTRATION BUILDING.

There is no apparent provision for the removal of vitiated air from the following rooms:

On the First Floor.—All rooms, with the exception of the Superintendent's office, Board room, Main Dining room, and the Men's and Women's toilet rooms on the south side.

On the Second Floor.—All rooms, except the Sitting room, Dining room, and the several toilet rooms.

On the Third Floor.—All rooms, except the three principal toilet rooms, and kitchen.

It is recommended that vent flues be provided for each room in which no such provision has been made, and that the vent registers *be at the floor levels.* Ceiling vents would abstract the fresh warm air from the rooms, probably as fast as it would enter through the transoms.

With the exceptions before-mentioned, the plans were approved, in so far as this Board is required by law to examine and express an opinion.

PLANS FOR TWO SHACKS, AT THE STATE SANATORIUM FOR TUBERCULOSIS, HOWELL.

In accordance with Section 2229, Compiled Laws of 1897, plans for two shacks, at the State Sanatorium for Tuberculosis, Howell, were examined by the State Board of Health.

The plans contemplate the erection of two shacks, considerably smaller than those already erected, each of which will accommodate six patients.

The specifications accompanying the plans state that, "The general system of plumbing must be in accord with the work in operation in present completed shack as regards supply, sizes, traps, etc., with such omissions and changes as are indicated on these drawings and named in these specifications, and must be absolutely sanitary and mechanically perfect when completed."

The specifications further state that the soil pipe from closet is to be carried five inches from the building. This should be changed to read five feet, as a broken sewer pipe or a defective joint—such as may occur when iron and earthernware pipes are joined—within five inches of the building would create an unwholesome condition of the subsoil under the building.

With the exception mentioned above, the plans were approved, in so far as this Board is required by law to examine and express an opinion.

PLANS FOR A PROPOSED NEW CHAPEL AND ASSEMBLY HALL BUILDING, AT THE EASTERN MICHIGAN ASYLUM, PONTIAC.

A preliminary examination of these plans showed that the arrangements for the ventilation of this building were not good; also that the general arrangement of the underground sewers and drains and the termination of the soil pipes above the roof were not shown on the plans. It was, therefore, deemed advisable that the Sanitary Engineer of this Department visit the Eastern Michigan Asylum and confer with the authorities relative to needed changes in the plans. This was done, and several changes in the plan's were decided upon, particularly in respect to the ventilation of the building and the better protection of the lower floor against dampness.

It is now proposed to warm the building mainly by direct radiation, and to provide for the introduction of fresh air in the east end of the building. The fresh air will be taken from a point somewhat above the grade level and will be tempered by steam coils located in a room beneath the stage. This tempered air will be forced into the audience room by a fan. The fresh-air registers are to be located on each side of the stage, and about six feet above the floor levels.

The vitiated-air flues are planned to terminate at the attic floor and it is proposed to conduct the vitiated air from these flues, by sheet metal pipes, to the louvered opening in the east wall. It is recommended that the louvered opening be dispensed with and the brick flues either continued, vertically, to a point above the roof, or connected, by galvanized sheet iron pipes, with a main ventilator, of sufficient area, on the ridge of the roof. As the Chapel and Assembly Hall will never be used at the same time, the two vent flues are to be provided with dampers so that both flues can be used for the ventilation of each room, alternately.

The ventilation of the toilet rooms is to be accomplished by separate flues, extended above the roof.

It is proposed to place a fresh-air inlet in the sewer at each end of the building, outside of the walls, and to carry the same above the roof. It is suggested that as there will be no main trap in the sewer of this building and as the soil pipes are to be extended to a point above the roof, the fresh-air inlets would not be necessary.

It has been decided to omit the closet stools shown on the plans in the east toilet rooms.

The slope of the ground where this building is to be located is such that the north side of the building will be all at grade. On the south side of the building the rising ground will necessitate an areaway 30 feet by 6 feet. It is recommended that the bottom of this area be properly drained and be below the level of the floor of the Assembly Hall at every point.

PLANS FOR A PROPOSED NEW AGRICULTURAL HALL AT THE MICHIGAN AGRICULTURAL COLLEGE, EAST LANSING.

The general plans for this building, as drawn by E. A. Bowd, the architect, do not show the arrangements for the removal of sewage and subsoil water, neither is there anything in the specifications relative to the same nor to the heating and ventilation of the building beyond the statement that these matters will be taken care of by the State Board of Agriculture.

Particulars relative to the heating, ventilation, sewerage and drainage of the building have been obtained from a separate blue print of the Ground Floor, and accompany description, prepared by Prof. G. W. Bissell, from whom it is learned that:

1. A combination system of heating and ventilation similar to that installed in the new Engineering Building, will be used.
2. The foul air will be provided with exits from all rooms by means of flues leading to Star ventilators in the roof.
3. There will be installed direct radiation in the several rooms sufficient in amount to make up from 50 per cent to 100 per cent of the heat lost through the walls.
4. Automatic, thermostatic temperature control will be on the direct radiators in each room.
5. All sewers inside the outside lines of the walls will be of extra heavy cast iron pipes, with leaded joints, or of wrought iron pipe with special drainage fittings.
6. All sewer pipes outside the wall lines will be of No. 1 vitrified sewer pipe with joints yarned and cemented.
7. House traps, with vent hubs extending to the basement floor and provided with brass screw plugs, will be placed on each soil pipe run where it leaves the building.
8. Each branch, or circuit, of the roof water system will be protected by a running trap, placed at or near the point where the connection is made with the manhole, and the seals of these traps protected by the waste from the drinking water fountains.
9. Vitrified farmer's drain tile will be laid around the footings of the outside walls and along the footings of the inside walls which surround the west end of the stock judging room, with an outlet either to the manhole through a running trap or independently to the Cedar river.

It is suggested that the single vent opening in the Farm Machinery room would be inadequate for the ventilation of this room and an additional vent flue, on the other side of the stairway, would seem to be desirable.

No ventilation seems to have been provided for the Laboratory adjoining the Seed and Stock room on the third floor, and it is recommended that this be done.

Without exception, the toilet rooms are all badly located in so far as lighting is concerned. One toilet room on each floor, located next to an outside wall, would be much preferable and is hereby recommended.

If the roof lights are made to open, for summer ventilation, the terminals of the soil pipes should be elevated as much as practicable so as to remove the possibility of the entrance of sewer air to rooms on the fourth floor.

It is recommended that the connections between the iron and stoneware sewers be made at points not less than five feet outside of the foundation walls, instead of at the wall lines, as shown.

The provision of a separate trap on each line of soil pipe where it leaves the building is not considered necessary and would tend to stoppages in the sewers. It is recommended that but one main trap be used for the entire sewerage system, the same to be located at the outlet of the manhole and the top of the latter to be extended above grade and have a grated cover. This arrangement would allow of the circulation of air through every part of the sewerage system and reduce the possible sources of stoppages to the minimum.

It is recommended that if the tile subsoil drains are made to discharge into the sewer manhole as contemplated, provision be made, as in the case of the storm drains, for maintaining the seal of the trap of these drains. It would be preferable, however, to conduct both roof and subsoil water to the river by a set of pipes separate from the sewer.

With the exceptions before-mentioned, the plans are approved, in so far as this Board is required by law to examine and express an opinion.

PLANS FOR A PROPOSED NEW WOMEN'S BUILDING, BRANCH NO. 5, AT THE STATE ASYLUM, IONIA.

In accordance with Section 2229, Compiled Laws of 1897, plans (set No. 2) for a proposed new Women's Building, Branch No. 5, at the State Asylum, Ionia, were examined by the State Board of Health.

The plans contemplate the heating of the building by indirect radiators, placed in basement corridor and in two rooms on the north side of the building.

In a letter, dated March 14, from Dr. O. R. Long, the Medical Superintendent, it was stated that the entire basement will be used as a fresh-air chamber, and the basement plan shows five points at which fresh air is to be admitted to the basement, viz., at each end of the east and west corridor, at the angle near the northwest corner of the building, and at two points beneath the portico of the main entrance. By reason of the fact that dust and organic refuse, possibly infected, may accumulate in the space beneath the portico, through which the fresh air would have to travel in its passage to the basement window and to the 27-inch galvanized iron pipe, the location of fresh-air openings at this point is considered not good.

The basement plan shows a number of rooms marked "Storage," but, in his letter of March 14, Dr. Long stated that it is not intended to use the rooms for that purpose.

The vitiated air is to be removed from each room by separate flues, extended to the attic and there connected, by laterals, with long horizontal ducts which, in turn, are to be connected with a single ventilator on the roof. The proposed method of terminating the vitiated-air flues is not approved. Each vent flue should be carried separately to the outer air above the roof and as nearly vertical as practicable. For convenience and architectural appearance, a number of such flues could be grouped and pass through the roof as one stack.

On page 35 of the specifications accompanying the plans, provision is made for vent registers both at the floor line and the top of the room. This is not approved, for the reason that both registers will be liable to be open at the same time and thus neutralize the draft in the flue. In the cold weather, the vitiated air should be removed from the rooms at the floor line; in the warm weather, by open windows.

On page 11 of the specifications, provision is made for an iron grating over the catch-basin on the south side of the building. As this basin is not more than seven or eight feet from the building, it should have a tight-fitting cover instead of a grating.

On page 25 of the specifications, provision is made for "iron traps on iron pipe near each basin where shown, with 4-inch hand hole on top from which run a 4-inch cast iron pipe to grade and cover top with a brass capped screw clean out." There is but one basin shown on the plans and the location of the iron traps is not shown. It is recommended that but one catch-basin be used for this building; that a manhole, with grated cover, be constructed in the sewer, on the north side of the building, beyond the last lateral; that the main sewer trap be placed at the outlet of the proposed manhole and so that it will be accessible from the manhole; that all rain water drains be carried to this manhole, separate from the sewers, and that they enter the manhole, at one point, through a trap with an extra deep seal, this trap, also to be accessible from the manhole. By this arrangement, the rain water conductors cannot act as ventilators to the sewer and the sewer will be well ventilated throughout.

The basement plan shows five openings to be left in the underground sewer "for fixtures to be installed in the future." If, as would appear from the plans, these fixtures will be in the basement, there would be a probability of foul air from the room in which the fixtures are to be placed entering the main corridor through the south doors and thus contaminating the air supply of the building. This can be obviated by walling up the most westerly opening on the south side of the corridor, and the east opening of the room in which the clothes chute is to be placed, and access could still be had to every part of the basement.

PLANS FOR AN ADDITION TO THE FARMHOUSE, A TWO-STORY BRICK BAKERY BUILDING, AN ADDITIONAL DINING HALL AND KITCHEN BUILDING, AND TWO ADDITIONAL COTTAGE BUILDINGS, TO BE KNOWN AS NOS. 3 AND 4, AT THE MICHIGAN HOME FOR FEEBLE-MINDED AND EPILEPTIC, LAPEER.

In accordance with Section 2229, Compiled Laws of 1897, plans for an addition to the farmhouse, a two-story brick bakery building, an additional dining hall and kitchen building and two additional cottages, to be known as Nos. 3 and 4, at the Michigan Home for Feeble-Minded and Epileptic, Lapeer, have been examined by the State Board of Health.

The plans were explained by A. E. Munger, of the firm of Clark & Munger, architects, Bay City, and by Dr. G. L. Chamberlain, Medical Superintendent of the Home.

ADDITION TO THE FARMHOUSE.

Provision is made for a bell trap, with sewer connection, in the new cellar. This is not approved, for the reason that the trap would be very liable to become dry and remain dry during a considerable portion of the year, and thus permit the entrance to the basement of sewer air. It is recommended that the floor of the cellar be drained into the trap under the shower in the toilet room adjoining.

It is recommended that the drainage of the shower bath be accomplished by the use of a good trap, with a deep seal, and not by a bell trap, as specified. Bell traps are an abomination and should not be permitted under any condition.

The plans show a downspout, from the tin roof over the Men's Room and Porch on the first floor, connected with the sewer, at its terminal, but do not show any provision for preventing this downspout from discharging sewer air, from its upper end, in the vicinity of windows. As any trap which might be placed at the base of this downspout would be liable to become dry during a dry season, it is recommended that the rain water be discharged on to the surface of the ground and not into the sewer.

It is specified that the soil vent pipes be reduced to three inches above the fixtures and be of "standard weight iron." This is not approved, for the reason that a three-inch extension above the roof would be very liable to be closed by hoar frost during the very cold weather, and "standard" pipe is considered too light to be used in any part of the sewerage system.

The specifications provide for the heating of the new addition by "radiation the same as now in use," which, it is learned, is direct radiation. This is not approved, for the reason that there is no provision for the supply of fresh air to any of the rooms. When the plans for the present farmhouse were examined by this Board in June, 1901, it was proposed to heat the rooms by direct-indirect radiation, and while this method of heating was, and is yet, considered inferior in many respects to the indirect method of heating, in view of the fact that the occupants of the rooms would be few in number, the plans were approved.

It is now discovered that no provision whatever was made for the supply of fresh air to the rooms in the manner specified. It is recommended that provision be made for supplying to the rooms in the new addition a sufficient amount of fresh air for proper ventilation.

No provision seems to have been made for the removal of vitiated air from the rooms in the new addition, and it is recommended that a vent flue, of ample size, be provided for each room, and that the same be carried *separately* to the roof and be there connected with a suitable ventilator on the roof.

BAKERY BUILDING.

The plans contemplate the connection, through running traps, of the three-inch tile subsoil drain with the sewer. This is not approved, for the reason that the traps would be liable to be dry during a considerable portion of the year, and for the further reason that, in the event of a stoppage in the sewer, sewage would be liable to back up into and saturate the subsoil. It is recommended that the subsoil drains do not discharge into the sewers but into land drains; but if this is not practicable, they should be connected with the sewer through a single trap, with a deep seal, and provision should be made for maintaining the seal of this trap at all times, and also for preventing sewage from backing up into the drains at any time.

Provision is made in the plans for a bell trap in the floor of the bakery. This is not approved, for the reason that the raising of the cover would break the seal of the trap and allow sewer air to enter the bakery. It is recommended that an iron P trap be used instead of the bell trap.

Provision is made in the plans for the connection of the rain water downspouts with sewer, but the specifications provide that the rain water sewer shall have no connection with the sewer, which is as they should be arranged.

The plans provide for cleanout openings to the sewer inside the building. This is not approved, for the reason that whenever the plugs were removed, sewer air would enter the building. Recommended that all cleanout openings be placed outside the building.

The plans show a toilet room with the entrance from the bakery. This is not approved, for the reason that foul air from the toilet room would pass into the bakery whenever the door was opened. Recommended that the entrance to the toilet room be from outside the building and not from any part of the interior.

It is recommended that the sewer from the toilet room be laid outside instead of under the building, and that, as an extra precaution against the entrance of sewer air to the bakery, the waste pipe from the sink and the floor drain of the bakery be disconnected from the sewer by a ventilated trap outside the building.

It is further recommended that the hand hole trap, provided for the disconnection of the sewer of this building from the main sewer, be omitted, so that the extension of the soil pipe above the roof may assist in the ventilation of the main sewer.

No provision seems to have been made for the ventilation of any part of this building, and it is recommended that, if the windows are not to be constantly open, provision be made for frequent changes of air in the rooms. It is also recommended that provision be made for the ventilation of the toilet room at such times as the window may be closed.

DINING HALL AND KITCHEN BUILDING.

It was stated by the architect that the catch basin on the south side of the building would be used for the disconnection of the subsoil drains from the sewer, and that the sewer from the water closet, sinks, etc., would pass through, but not discharge into, the basin. For the reasons previously given in connection with the report on the Bakery Building, it is recommended that provision be made for preventing the backing up of sewage into the subsoil drains of this building; also for the maintenance of the proper water level in the catch basin, to prevent the passage of sewer air to the catch basin or to the subsoil drains.

For the maintenance of the water seals of the land drains and of the catch basin, and for removing any possibility of sewer air entering the building through the floor drain or by way of the cold storage drain, it is recommended that the floor drain and the cold storage drain discharge into the catch basin and not into the sewer, as shown on the plans.

For the disconnection of the sewer of this building from the main sewer, a hand hole trap, with a fresh-air inlet, is provided, but as this would interfere with the proper ventilation of the main sewers of the institution, it is recommended that the main trap and air inlet be dispensed with.

No specifications for the plumbing were submitted, therefore no opinion can be offered relative to this part of the work.

COTTAGES NUMBERS 3 AND 4.

As these cottages are practically the same in design and general arrangement, the following criticisms and recommendations are intended to apply to both buildings:

Provision is made in the specifications for 3-inch porous tile drains around the buildings, with outlets into the sewers, but the same do not appear on the plans. For the reasons stated in the section of this report relative to the Bakery Building, it is recommended that, the connection of the subsoil drains with the sewers be through traps, with deep seals, and that provision be made for maintaining the seals of the traps at all times, and for preventing sewage backing up into the drains in the event of a stoppage of the sewer.

The plans show provision for floor drainage in the Boot Rooms and adjacent outdoor areas, but do not specify what kind of traps are to be used. As any traps in the areas would freeze up in very cold weather, and lose the whole or a portion of their water seals in dry weather, it is recommended that traps, with deep seals, be provided for the floors of the Boot Rooms, and that the area drains be without traps and be made to discharge over the water seals of the traps in the Boot Rooms. It is also recommended that catch pits be placed in the areas, for the purpose of keeping dirt, leaves, etc., from entering the drains, and that the outlets of the catch pits be several inches above the bottoms of same.

The plans provide for main traps and manholes for each of the sewers, but as this arrangement would interfere with the ventilation of the main sewer beyond the traps, it is recommended that the main traps be omitted.

No specifications for the plumbing were submitted, therefore no opinion can be offered relative to the same.

The plans provide for floor drainage in each of the toilet rooms on the first and second floors, but do not specify what kind of traps are to be used. Recommended that cast iron P traps, with deep seals, and not bell traps, be used.

It is proposed to heat and ventilate the day rooms, dormitories, toilet rooms and corridors by the fan system. This is commended.

No provision seems to have been made for the ventilation of the Reception rooms, Matron's rooms and two Isolation rooms on the first floor; nor for the Isolation rooms, Matron's rooms, Attendant's rooms and Attendant's bath rooms on the second floor, and it is recommended that provision be made for the ventilation of each of these rooms.

With the exceptions before mentioned, the plans of the several buildings are approved, in so far as this Board is required by law to examine and express an opinion.

PLANS FOR A CENTRAL HEATING PLANT, AT THE NORTHERN STATE NORMAL SCHOOL, MARQUETTE.

In accordance with Section 2229, Compiled Laws of 1897, plans for a Central Heating Plant, at the Northern State Normal School, Marquette, have been examined by the State Board of Health.

The plans provide for a sink in the Boiler room, but there is nothing in the plans or in the specifications for "Contract No. 2," to indicate whether the waste pipe is to be connected with the tile floor drain or to have connection with a sewer. It is assumed that the sink will discharge into the drain shown on the plans, and as greasy water will probably find its way into the sink and thus create a foul condition of the drain, the waste pipe from the sink, together with the floor drains, should be properly trapped to prevent foul odors from entering the building at these points.

The plans are approved, in so far as this Board is required by law to examine and express an opinion.

PLANS FOR A PROPOSED PHYSICAL TRAINING BUILDING AT THE CENTRAL STATE NORMAL SCHOOL, MT. PLEASANT.

In accordance with Section 2229, Compiled Laws of 1897, plans for a proposed physical training building at the Central State Normal School, Mt. Pleasant, have been examined by the State Board of Health.

The plans were explained by E. W. Arnold, of Battle Creek, architect of the building.

It is proposed to heat the building principally by direct radiation, and to ventilate the same by forced draft.

There is to be no automatic regulation of the temperature of air in the rooms, such as is the usual accompaniment of a fan system of ventilation, but, rather, a valve at the base of each warm-air flue, with a device for operating the same from each of the rooms. As the closing or partial closing of any of these valves would cut off or curtail the air supply, it is recommended that the regulation of the temperature of air in the rooms be accomplished by the regulation of the valves of the direct radiators, and that the regulation of the amount of air passing through the rooms be accomplished, if necessary, by changing the areas of the register openings to the vent flues to suit varying conditions of the weather.

The plans show a long, horizontal duct for the ventilation of the Swimming Pool room, which, it is believed, will not accomplish the purpose. It is recommended that provision be made for exhausting the air from this room by means of a fan, placed at some point near to the junction of the horizontal and vertical flues.

With the exceptions before mentioned, the plans are approved, in so far as this Board is required by law to examine and express an opinion.

PLANS FOR A PROPOSED LIBRARY AND MUSEUM BUILDING FOR THE MICHIGAN COLLEGE OF MINES, HOUGHTON.

In accordance with Section 2229, Compiled Laws of 1897, plans for a proposed library and museum building for the Michigan College of

Mines, Houghton, have been examined by the State Board of Health and the following opinion is offered thereon.

No person was present to explain the plans, but the following description of the proposed sanitary arrangements of the building was furnished by Fred W. McNair, President of the College:

"I have yours of the 25th instant and would say in reply that these plans do not show the heating of the building because the same will be put in by our own force. The heating will be steam from our central heating and power plant now under construction which will be carried to the building through the service tunnel. It will be low pressure controlled by the Johnson service system as in our other buildings of recent construction. The heating will be all by direct radiation.

"With reference to ventilation air shafts contemplating forced draft if necessary have been provided for only those places in which numbers of persons will be congregated for appreciable periods of time. This means principally the reading room attached to the library. Ventilation is provided for bookstack room not because of the fact that many people will be in it but because it seems well established that the durability of bindings is somewhat dependent upon ventilation. In the other rooms of the building, mainly the offices and the museum room, no especial means of ventilation are considered necessary beyond the windows. None of these will hold more than a few persons at a time.

"Regarding the underground sewer and the drain, would say that sewer will extend in a straight line from the toilet rooms in the basement directly across building, leaving the same through the wall between door and window on north side. The cross sewer serving toilet room on first floor will run at right angles to the branch just mentioned just south of the wall which bounds stack room stairway and under the basement floor the same as the first branch. You will note the position of soil pipe on basement plan and sewer will leave the bottom of this pipe. Outside of wall this joins our main sewer, which discharges into Portage Lake.

"You will note that the conductors from roof are lain in a separate drain running to a cesspool to be situated 50 feet from any building wall and that these are not connected with the sewer in any way. Personally I am in doubt whether this is the best construction and would like your opinion. It would seem to me better to turn all these into the main sewer outside of the building, having the sewer vented where they join. Our sewer has capacity enough to care for any flow of water which might result and it would seem to me advantageous to have it flushed by water from the roof. I enclose a pencil sketch to insure clearness."

The fact that but a few persons at a time will occupy the offices and other rooms for which no ventilation has been provided, other than what might be effected by windows, does not remove the necessity for some special means of ventilation, and it is recommended that provision be made for a change of air in each occupied room equal to at least 2,000 cubic feet per hour for each occupant.

If there is no possibility of dampness occurring in any of the buildings as the result of discharging the rain water into a cesspool, as proposed, this method of disposal would be considered preferable to the discharge of the rain water into the sewer because, unless there is, at all times, absolute disconnection between the sewer and rain conductors, the latter will be liable to discharge sewer air in the vicinity of windows.

If the sewer of this building is not too large and is laid with the proper grade, it should not require to be flushed by the rain water from the roof.

Should it be decided to discharge the rain water into the sewer, and not into a cesspool, the rain conductors should be made to connect with the sewer, at one point only, through a trap with a deep seal, and provision should be made for the automatic replenishing of the water in this trap as fast as it may become reduced by evaporation between rains.

PLANS FOR A PROPOSED INFIRMARY NO. 1, AND FOR AN EXTENSION TO THE DINING ROOM, AT THE STATE SANATORIUM, HOWELL.

In accordance with Section 2229, Compiled Laws of 1897, the plans for a proposed infirmary No. 1, and for an extension to the Dining Room, at the State Sanatorium, Howell, have been examined by the State Board of Health and the following opinion is offered thereon:

INFIRMARY NUMBER ONE.

The plan contemplates the heating and ventilation of this building by direct-indirect radiation and by vent flues (with registers in the rooms both at the floor and ceiling levels) connected with a main ventilator on the roof.

The provision for vent registers at the ceiling levels is not approved, for the reason that they may be open at the same time the registers at the floor levels are open, and thus spoil the ventilation by allowing the fresh warm air to escape from the rooms before it has had time to pass through every part of the same. In the warm weather, when windows would be open at all times, the ceiling registers would not be necessary.

No provision seems to have been made for the ventilation of the Nurse's room and the toilet rooms, other than by open windows, and it is recommended that provision be made for ventilating these rooms, or at least the toilet rooms, when the weather would be too cold for continuous ventilation by the open windows.

The plan shows "crock" sewers under the building. As such sewers are fragile, and as a leaky sewer under a building would create a bad condition of the soil, from whence air might be drawn into the building, it is recommended that all the sewer, and connections, under the building be of heavy cast iron pipes, with caulked joints, and that the iron pipes extend at least three feet outside the building, instead of five inches, as provided on page 11 of the specifications.

No provision seems to have been made for the disconnection of the rain conductors from the sewer to prevent the conductors from discharging sewer air at improper points. It is recommended that, if the rain water cannot be disposed of without discharging it into the sewer, the rain conductors be connected with the sewer *at one point only* and through a trap with a deep seal, and that the water from the wash basin in the corridor be made to discharge into the rain water drain so as to maintain the seal of the trap in a dry season.

DINING ROOM EXTENSION.

The plan contemplates the heating of the Dining Room by means of direct-indirect radiation and the bedrooms by direct radiation.

The proposed method of heating the bedrooms is not approved, for the reason that there is no provision for a supply of fresh air at such times as the windows may be closed. It is recommended that provision be made for a sufficient supply of fresh air to each room during the time the windows may be closed.

It is proposed to place the vent registers in the rooms both at the floor and ceiling levels. This is not approved, for the reason given in the opinion upon the plans for Infirmary No. 1.

The plan shows conductor pipes to be connected with "crock" pipes under the building, but does not show whether the said pipes are connected with a sewer or with a land drain. The same treatment is recommended for these conductors and drains as for the Infirmary Building.

With the exceptions before-mentioned, the plans are approved, in so far as this Board is required by law to examine and express an opinion.

For the purpose of aiding the boards of control of State institutions, architects, and other interested persons, in the preparation of plans for State buildings which shall be in accordance with the best modern methods of sanitary construction, a special pamphlet, entitled "The Examination of Plans for State Buildings," was prepared in the latter part of 1907, and copies of the same were mailed to the following: The members of the boards of control and superintendents of the State Penal, Reformatory, Charitable and Educational institutions in this State; each architect in this State; the members and Secretary of the State Board of Corrections and Charities; the members and ex-members of the State Board of Health; Sanitary Journal Exchanges, and the Secretaries of other State and Provincial Boards of Health.

EXAMINATION AND LICENSING OF EMBALMERS.

Under the provisions of Act No. 132, Laws of 1903, three examinations were held during the fiscal year 1908, as follows:

Escanaba, August 22 and 23, 1907.
Lansing, November 13 and 14, 1907.
Detroit, May 20 and 22, 1908.

Of the 154 persons examined, 126 were granted licenses.

Reciprocal licenses were granted in fourteen instances.

A statement of expenses incurred in the operation of Act No. 132, Laws of 1903, may be found on a subsequent page of Part I. of this report.

The following letter, issued in November, 1907, will serve to show the scope of the embalmers' examinations, and the conditions to be complied with on the part of applicants for examination:

STATE BOARD OF HEALTH.

Office of the Secretary, Lansing.

TO THE FUNERAL DIRECTORS AND EMBALMERS.

Gentlemen:—You are hereby informed that a special meeting of the State Board of Health, called for the purpose of conducting an embalmers' examination, will be held in the capitol building, Lansing, Wednesday and Thursday, November 13 and 14, 1907. The examination will commence at 8 o'clock Wednesday morning, November 13.

Candidates will be required to take both *written* and *oral* examinations, with demonstration on a cadaver. Some of the general subjects included in the written examination, are:

(a) Visceral anatomy and the vascular system of the human body.

(b) The nature, action, modes of action and comparative value of disinfectants.

(c) The methods of embalming and of preparing bodies for transportation.

(d) How diseases are spread; the best methods for the restriction of diseases, and bacteriology in relation to the spread of diseases.

(e) The signs of death, and the manner in which it is determined.

Those who desire to take the examination at this time must fill out and return to the Secretary of the Board, the enclosed application blank, with an unmounted photograph of the applicant, signed in ink on the back, and properly certified to by a notary. A fee of five dollars must accompany the application. Remittances may be made by express or postoffice money order or by registered letter. *Personal checks cannot be used.*

Applications must be made in the name of an individual, and not of a firm.

Applicant's name must be signed in full.

All applicants should read carefully Sections 3 and 4 of the statute, of which a copy is enclosed herewith.

In the examination, a rating of seventy-five per cent or better must be made by the applicant to secure a license.

By direction of the State Board of Health.

FRANK W. SHUMWAY,
Secretary.

GENERAL AND SPECIAL WORK, AND EXPENDITURES, IN THE OFFICE OF THE SECRETARY DURING THE FISCAL YEAR 1908.

Much of the work of the office naturally groups itself under three heads,—the collection of information, the compilation of information so collected, and the dissemination of such information as will be of service in the restriction and prevention of disease.

COLLECTION OF INFORMATION.

As the local health officer is the principal medium by which this Department may reach and instruct the public in matters pertaining to the prevention of sickness and deaths, the appointment, and the return of the names and postoffice addresses of the health officers, in each year, are matters of more than ordinary interest and importance.

In each year, it is often necessary to make a first, second and third request for information which will place this office in communication with the local health officers, and during the time which is thus used up in corresponding and waiting, an outbreak of a dangerous disease may begin and become widespread before this office can afford the usual assistance to the proper officials in the locality.

It should be said, however, that there is an increasing tendency to comply with the law in this particular, and local boards of health now generally act promptly and cooperate cordially with this Department for the suppression of disease.

Having established communication with the newly appointed local health officers, pamphlets and other publications which may aid them in their work, together with the usual blanks for reports of outbreaks of diseases in their locality, are mailed from this Department. In some instances, considerable correspondence is necessary to instruct the health officials how to properly care for sick and infected persons, and to make reports which will be of value in the compilations for the annual reports and other publications of this Department.

In addition to the collection of the usual information relative to outbreaks of dangerous communicable diseases in this State, special information, upon subjects of public interest and importance, is sometimes asked for and is usually cheerfully furnished by a large number of the health officers and other persons from whom the information is sought.

During the fiscal year 1908, an effort was made to obtain information relative to the following principal question:

The sources of the public water supplies and methods of disposal of sewage of localities in Western Michigan, in order to determine, if possible, whether or not water supplies obtained from Lake Michigan showed definite pollution and, if so, what was the probable cause of such pollution. The information, however, on these points from the majority of the localities was so meagre as to permit of no report on the same, or helpful conclusions, but the fact was brought out that local equipment for investigation and examination into such conditions is insufficient and inadequate, and the necessity for systematic investigation and examination, by the State Board of Health, of the sewage pollution of the Great Lakes is rendered still more apparent.

The information referred to in the preceding paragraph was sought for principally, for the purpose of making a report to the Lake Michigan Water Commission, which was formed by the Governors of Wisconsin, Illinois, Indiana and Michigan for the purpose of investigating the sources and extent of the contamination of Lake Michigan and of advising remedies for the removal of same.

The Commission is composed of thirteen members as follows:

One from the Marine Hospital and Public Health Service of the National Government, to be appointed by the Surgeon General.

One from the War Department, to be appointed by the Secretary of War.

Three from Chicago, to be appointed by the Mayor.

One from Illinois outside of Chicago, to be appointed by the Governor.

Two from Milwaukee, to be appointed by the Mayor.

One from Wisconsin, outside of Milwaukee, to be appointed by the Governor.

One from Indiana, to be appointed by the Governor.

One from Indiana, representing the cities, Hammond, Whiting and East Chicago, to be appointed by the mayors of the cities, jointly.

One from Michigan, to be appointed by the Governor.

One from Grand Rapids, to be appointed by the Mayor.

The officers of the Commission are:

President, Dr. W. A. Evans, of Chicago.

Recording Secretary, Dr. Edward Bartow, of Michigan.

Treasurer, Dr. Frank W. Shumway, Lansing, Michigan.

Executive Committee: President Evans and Secretary Bartow, ex-officio, C. H. Hill of Chicago, Dr. Perry Schurtz of Grand Rapids, one member from Wisconsin, and one member from Indiana, not yet named.

Chicago is the headquarters of the Commission.

The representatives from each State on this Commission form a sub-commission for that state, to organize as seems best to further the objects of the Commission.

DISSEMINATION OF INFORMATION.

As stated in the preceding paragraph, each newly appointed health officer is supplied, by this Department, with information relative to his duties. This information is contained principally in a phamphlet entitled "Health Officers' Manual," and in pamphlets covering the principal points in the etiology and methods of restriction and prevention of each of the dangerous communicable diseases.

Upon the receipt of information relative to an outbreak of a dangerous communicable disease, in addition to the usual instructions and blanks for making the reports, there are mailed to the health officer a sufficient number of pamphlets, relative to the particular disease then present, for distribution to the families and immediate neighbors of the sick person. In this way, the people are educated as to their duty, under the law, and their cooperation with the local health officers often secured.

A pamphlet covering the law respecting nuisances, and containing information relative to their suppression, is published, and distributed among those persons directly interested, when a complaint of a nuisance is made to this Department.

A pamphlet, giving the law, and regulations of this Department, respecting the preparation and shipment of dead bodies, is published, and distributed among the licensed embalmers, railroad officials, and other persons interested in the transportation of the dead.

ANNUAL REPORTS.

About 2,500 copies of the annual reports are published each year, and about 2,400 copies are distributed among the following:

Members and Ex-Members of the State Board of Health; Local Health Officers; Secretaries of State, Territorial and Provincial Boards of Health; Sanitary Journal Exchanges; Library Exchanges; City Hospitals and Sanatoriums; Presidents and Secretaries of County Medical Societies; the State Library and the Secretary of State.

NEOSTYLE WORK.

An important method of disseminating information, which has been used very extensively by this Department, is the preparation, by the Rotary Neostyle, from time to time as occasion requires, of short articles, letters, etc., upon subjects of interest to the public, and their distribution to editors of newspapers in this State, to the leading sanitary journals, and to any person who may be especially interested, or who will print or use them for the benefit of others.

During the fiscal year 1908, neostyle work to the amount of 8,815 impressions was prepared, and a large portion of it mailed as soon as prepared. The principal subjects were:

Reports of proceedings of meetings of the State Board of Health.

Letter to health officers relative to the status of typhoid fever in their respective localities.*

Letter transmitting placards, "What to do and how to do it," for use in places where drowning is liable to occur.*

Letter to health officers relative to reporting cases of diseases.

Letters to superintendents and commissioners of schools relative to mailing list for teachers.

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*Copies of these neostyled publications may be found on subsequent pages of Part I. of this report.

Summary relative to reported measures for the relief and cure of tuberculosis in public and private institutions in Michigan.†

Letter relative to accidents and fatalities resulting from the celebration of the Fourth of July.*

Letters to mayors of cities and presidents of villages relative to "A Cleaning-Up Day."*

Letter to health officers relative to disinfection of privies in outbreaks of Typhoid Fever.‡

Reports of examinations of plans for State buildings.§

Directions for collecting and sending to the laboratory samples of water to be analyzed.*

Suggestions relative to cleaning floors.*

"PUBLIC HEALTH, MICHIGAN," BULLETINS.

During the fiscal year 1908, the principal subjects treated in the Quarterly Bulletin were as follows:

Third Quarter of 1907.—"Campaign Needed to Reduce Typhoid Fever to a Minimum," by Malcolm C. Sinclair, M. D., Grand Rapids; "A Practical and Sanitary Outdoor Closet," by the Michigan Department of Health; "Campaign Against Typhoid Fever in Michigan," by the Michigan Department of Health; "The Interpretation of Water Analyses," by H. E. Barnard, Indianapolis, Ind.; "Heating and Ventilating of Rural Schoolhouses," by J. E. McDonald, Lansing; "Suggestions Relative to the Heating and Ventilating of School Buildings of More Than One Room," by T. S. Ainge, Lansing.

Fourth Quarter of 1907.—"A Plea for the Systematic Training of School Children in the Care of their Teeth," by George Zederbaum, D. D. S., Charlotte; "The Duties of a Township Health Officer," by W. E. Hart, M. D., Elyria, O.; "Dust as a Factor in the Production of Disease," by Philip Boobbyer, M. D., Nottingham, England; "Contagious Diseases and their Prevention," by F. W. Shumway, M. D., Lansing.

First Quarter of 1908.—"The Care and Treatment of the Nose and Throat in Infectious Fevers," by J. Vernon White, M. D., Detroit; "Poisoning by Carbon Monoxide," by Fred R. Belknap, M. D., Benton Harbor; "Medical Inspection of Schools," by Elliott Kent Herdman, M. D., Ann Arbor; "Disinfectants, their Relative Values and Uses," by Professor Frank S. Kedzie, East Lansing; "Revision of the Health Laws of Michigan," by B. H. Southworth, M. D., Schoolcraft.

Second Quarter of 1908.—"Crusade Against Tuberculosis," by Victor C. Vaughan, M. D., Ann Arbor; "Local Anti-Tuberculosis Societies," by Herbert M. King, M. D., Liberty, N. Y.; "Michigan State Sanatorium for the Treatment of Incipient Tuberculosis," by Dr. R. L. Kennedy, Howell; "Review of Current Thought on Tuberculosis," by Marion A. Spratt, Lansing.

Beginning with October, 1907, a monthly bulletin has been issued and mailed to health officers, newspapers, a selected list of physicians, the superintendent of State charitable, penal and reformatory institutions, members and ex-members of the State Board of Health, and Sanitary Journal Exchanges.

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*Copies of these neostyled publications may be found on subsequent pages of Part I. of this report.

†This summary was printed in the Appendix of the annual report for 1907.

‡This letter is printed in connection with the articles on "Typhoid Fever in Michigan in 1907 and Preceding Years," in Part II. of this report.

§These reports may be found on preceding pages of this report.

The monthly bulletin is designed, principally, to furnish to health officials and physicians information relative to the prevalence of the several dangerous communicable diseases in the State, but particularly in their immediate vicinity.

By a table in these bulletins, which shows the prevalence of the several diseases in each month of the year and in the average year, the time of the year when any disease may be expected to increase or decrease in prevalence may be noted in advance; and comparisons may be made of the prevalence of any disease in any two or more months in the same year, or between any month in the current year and the corresponding month in the average year.

Special mention is made in the bulletin each month of the disease which is usually most prevalent during the current month; and items of interest, which have an important bearing upon the public health, are inserted as space will permit.

Instructive diagrams, relating principally to the status of the several diseases, occupy the bulk of the front page of each issue of the bulletin.

WARNINGS TO HEALTH OFFICERS RELATIVE TO IMMIGRANTS, POSSIBLY EXPOSED TO DANGEROUS COMMUNICABLE DISEASES, DESTINED TO SETTLE IN MICHIGAN.

In past years it has been customary for the immigration officials at certain ports in Canada and in the United States to notify this Department relative to the arrival of immigrants who had been exposed on shipboard to dangerous communicable diseases and who were destined to points in Michigan. Upon the receipt of this information, a copy of each such notice was mailed to the health officer of the jurisdiction to which the immigrants were going in order that he might keep watch over such persons until the danger period was past. As a rule, however, the notices were received at this office sometime after the immigrants had arrived at their destination, and, in many instances, the health officers could not locate them, particularly in the large cities. For these reasons, the notices were discontinued in 1907.

SCHOOL WORK.

In compliance with Act No. 146, Laws of 1897, a copy of a special issue of the "Public Health, Michigan," Bulletin, known as the "Teachers' Edition," is mailed to each teacher and superintendent of the public schools in this State at the beginning of each school year. This manual contains the documents issued by this Department, on the restriction and prevention of nine of the dangerous communicable diseases, the document on "Disinfectants, their relative value and uses," and a list of suggestive questions for teachers. In addition to this manual, each teacher and superintendent is supplied with a copy of each regular quarterly issue of the "Public Health, Michigan," Bulletin.

Upon the invitation of the County Commissioners of Schools in the following counties, J. E. McDonald, Deputy Secretary of this Department, attended the following meetings and spoke upon the subject of School Sanitation, including heating, lighting, ventilation, water supply, intermissions, sweeping, outhouses and school grounds:

Meeting of Eaton County Teachers' Association, at Charlotte, October 19, 1907, since which time the Commissioner of Schools certifies that there has been a manifest improvement in the schools.

Meeting of Iosco County School Officers, at Tawas City, November 8, 1907.

Meeting of Bay County School Officers, at Bay City, November 9, 1907.

Meeting of Allegan County School Boards, at Allegan, November 22, 1907.

Meeting of Calhoun County School Boards, at Marshall, November 23, 1907.

Meeting of Oakland County School Officers, at Pontiac, December 13, 1907.

Meeting of Kent County Teachers' Association, at Grand Rapids, January 18, 1908.

Meeting of Mecosta County Teachers' and Patrons' Association, at Big Rapids, February 8, 1908.

Meeting of Branch County Teachers' Association, at Coldwater, May 2, 1908.

While the law requires that the pupils in our schools shall be instructed in the methods of preventing diseases, it does not require that the buildings in which the pupils are taught shall be equipped with the proper means for securing a constant and adequate supply of fresh air in each of the rooms, and, as a result, a large number of our school buildings are imperfectly ventilated, hence predisposing to disease. In conjunction with the Department of Public Instruction, this Department is earnestly working for better sanitary conditions in our schools, the work, however, on the part of this Department, being limited by the lack of an appropriation for this purpose. In addition to advice by mail relative to the sanitary arrangements of school buildings, the Sanitary Engineer of this Department has, upon request, made examination of plans for and inspection of a number of school buildings with the view of determining their sanitary condition and advising the boards of education relative to necessary changes and improvements. Reports relative to such examinations and inspections during the fiscal year 1908 may be found on subsequent pages, under the heading "Work in the Division of Sanitary Engineering."

ADVICE TO LOCAL BOARDS OF HEALTH, BOARDS OF EDUCATION, ETC.

Upon invitation, the Secretary or Sanitary Engineer of this Department has made visits to localities, and in other ways assisted the local authorities in efforts for the suppression of diseases and the correction of insanitary conditions. Statements relative to this special work during the fiscal year 1908 follow:

MOVEMENTS OF THE SECRETARY OF THE BOARD DURING THE FISCAL YEAR 1908.

In addition to his attendance at the National Conference of State Boards of Health and Embalmers' Examining Boards of the United

States, at Norfolk, Va., October 4-14, 1907; meeting of 2nd Councilor District, Michigan State Medical Society, at Jackson, December 5, 1907; conference of physicians and supervisors of Montcalm County, at Greenville, January 8, 1908; meeting of Michigan State Anti-Tuberculosis Society, at Detroit, February 21, 1908; meeting of Michigan Academy of Science, at Ann Arbor, April 2, 1908; meeting of Ottawa County Medical Society, at Holland, April 13, 1908; meeting for the organization of "Lake Michigan Water Commission," at Chicago, April 18, 1908; meeting of Shiawassee County Medical Society, at Owosso, May 5, 1908; meeting of the State Board of Health for the examination of embalmers, at Detroit, May 20-22, 1908; and meeting of Michigan State Anti-Tuberculosis Society, at Grand Rapids, June 23-24, the Secretary of this Board made special visits to the under-mentioned localities for the purposes named:

Glenwood, August 12-14, 1907.—To investigate the source of contamination of water supply in an outbreak of typhoid fever.

Ludington, August 17-19, 1907.—To inspect the grounds for Encampment of State troops, by request of the Military Department.

Escanaba, August 21, 1907.—To make inspection of the water supply and to determine, if possible, its relation to outbreaks of typhoid fever.

Farmington, October 18-19, 1907.—To investigate an outbreak of typhoid fever.

Charlotte, November 5, 1907.—To make investigation relative to a nuisance.

Springport, and Parma Township, Jackson County, and Hamlin Township, Eaton County, November 22, 1907.—To investigate outbreaks of smallpox.

Manistee, December 11-13, 1907.—To investigate an outbreak of smallpox.

Clarence Township, Calhoun County, December 16, 1907.—To investigate an outbreak of smallpox.

Hesperia Village and Newfield Township, Oceana County, and Denver Township, Newaygo County, December 30, 1907, to January 1, 1908.—To investigate outbreaks of smallpox.

Jackson, January 4, 1908.—To investigate an outbreak of smallpox in the State Prison.

Salem Township, Washtenaw County, January 20, 1908.—To make an investigation into what was believed to be an outbreak of smallpox but which turned out to be chicken-pox.

Albion City and Marengo Township, Calhoun County, and Centerville Village, St. Joseph County, January 27-29, 1908.—To investigate outbreaks of smallpox.

Nashville Village and Maple Grove Township, Barry County, February 5, 1908.—To investigate an outbreak of smallpox.*

Davisburg, February 29, 1908.—To investigate an outbreak of smallpox.*

Campbell Township, Ionia County, March 9, 1908.—To investigate an outbreak of scarlet fever.

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*Detailed reports of these trips will be printed in Part II. of the annual report for 1909.

Ionia, March 10, 1908.—To investigate an outbreak of smallpox in the State Reformatory.

Fremont, March 17, 1908.—To investigate an outbreak of smallpox.

White Cloud, March 17, 1908.—To investigate an outbreak of scarlet fever.

Ionia, March 18, 1908.—To inspect three school buildings.†

Kalamazoo, March 25, 1908.—To investigate an outbreak of smallpox at Recreation Park.

Ionia, March 26, 1908.—To investigate an outbreak of smallpox at the Asylum for Criminal Insane.

St. Clair, April 7, 1908.—To investigate the water supply in its relation to the prevalence of typhoid fever in that city.*

Kalamazoo, April 20, 1908.—To make further investigation into the outbreak of smallpox arising from the Recreation Park cases, and to investigate an outbreak of smallpox in the print shop and bindery of Ihling Bros. & Everard.*

Cassopolis, May 13-14, 1908.—To investigate an outbreak of smallpox in the city and adjoining township.*

Capac, May 29, 1908.—To investigate an outbreak of smallpox.*

Leroy Township, Calhoun County, June 1, 1908.—To investigate outbreaks of smallpox in Sonoma and East Leroy.

WORK IN THE DIVISION OF SANITARY ENGINEERING.

Much of the work of this Division is carried on by correspondence and, occasionally, by telephone, detailed statements relative to which cannot be given in this report for lack of space. However, some of the interesting correspondence in the fiscal year 1908 is printed on subsequent pages for the benefit of those who may require information along similar lines.

One of the very important lines of work is the examination of the plans for the heating, ventilating and sewerage of buildings at State institutions, particulars and reports of which are printed on preceding pages.

But the work which has been productive of the greatest good, and which could be extended with very great benefit to the public if funds were available for this purpose, is the field work which has been carried on during the past two years in response to requests from the local authorities. A summary of the special visits made by the Sanitary Engineer during the fiscal year 1908 follows:

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*Detailed reports of these trips will be printed in Part II. of the annual report for 1909.

†A report of this inspection is printed in connection with other reports of work in the Division of Sanitary Engineering.

INSPECTION OF SCHOOL BUILDINGS AT ST. LOUIS.

[Division of Sanitary Engineering.]

July 22, 1907.

F. W. Shumway, M. D., Secretary State Board of Health:

Dear Doctor—In accordance with the request of the Board of Education of St. Louis, on July 19, I visited that city and made an inspection of the toilet rooms of the Grammar School, with the view of devising a plan for ventilating the same.

The toilet rooms are not well located, are much too small, and are insufficiently lighted and ventilated. For these reasons, it is recommended that these rooms be no longer used for this purpose, and that two new toilet rooms be constructed in the east half of the east room in the basement, which room is now used for storage purposes and is damp and unwholesome; but whether new toilet rooms are constructed in this room or not, the entire floor of the room should be well cemented to get rid of the unwholesome condition. If the recommendation relative to the new toilet rooms is adopted, the cement floor of the east half of the room should be made to slope to two points where connections should be made with the sewer, through traps with deep water seals, for floor drainage.

In the construction of the proposed toilet rooms, in addition to the cementing of the floors, to which reference has been made in the preceding paragraph, a brick wall, extending from floor to ceiling and running north and south, should divide the east room of the basement into two separate rooms, and a brick wall, of similar construction, should divide the east half of the room into two parts,—the south half for the girls toilet room and the north half for the boys toilet room. The ceilings of the toilet rooms should be lathed and plastered in place of the present matched lumber ceiling. The iron door in the large brick ventilating flue in the east wall of the basement should be securely fastened, and all openings into this flue cemented up so that air from the toilet rooms may not have access to the flue.

For the ventilation of the proposed toilet rooms, two galvanized sheet iron flues, not less than two square feet in area and extending from the basement floor to a point above the ridge of the roof near to the belfry, should be provided, the tops of the flues to terminate in a main ventilator, placed on the ridge, and having an area of not less than four square feet. As the present brick ventilating flue extends into the school rooms about 16½ inches, the proposed sheet iron flues could be made 16½ inches by 18 inches, and placed on each side of and close to the brick flue, making uniform projections into the rooms. The sheet iron flues should be given a good upward slope in the attic where they are carried across to the main ventilator. The vent registers in the toilet rooms, should be at the floor levels and should be not less than 18 inches by 24 inches in size.

The plumbing fixtures should be of modern types, and such as are especially designed for school buildings. The water closets should be of the siphon wash down pattern, with seat action flush, preferably of Clow's manufacture. The urinals should be of the trough pattern, well and substantially enameled, set sufficiently low that the smallest boys can use them without difficulty, and provided with automatic flushing apparatus. The usual provision for such toilet rooms is one water closet for each twenty-five boys and one for each fifteen girls. The screens for the water closets should be set on iron posts, about twelve inches in height, to permit of easy and thorough cleansing of the floors and of free circulation of air in the vicinity of the fixtures.

The doors leading to the toilet rooms should be made to swing, and be provided with strong springs, so that they cannot be left open and thus allow of the escape of air from the toilet rooms into the room in which the wooden fresh-air ducts are located.

The construction of the partition across the east room will render the west half of the room comparatively dark, to obviate which a window should be placed in the north wall of this room.

To gain access to the toilet rooms, the wooden fresh-air duct will have to be changed somewhat, and it is recommended that when this is done, all cracks and other openings in the duct and radiator enclosures be made tight, so that air from the basement cannot gain access to the fresh-air supply. The outside fresh-air opening will require to be changed from the south to the north side of the building, and the fresh-air duct cut off and the end tightly sealed, on the south side of the most southerly radiator. On the north side of the room, the duct should be cut off at a point north of the second radiator, and a new duct, of ample dimensions and having the form of an offset, substituted for the present duct at that point. To afford sufficient room for persons to pass under the duct at the north end of the room, it will be necessary to make the new part of the duct wider but not so deep as the present duct, but the area should not be less than that of the present duct near to the south wall. The connection of the old duct with the new part should be made by flaring the sides of the new duct at that point, and this can be more easily done if the latter is made of galvanized sheet iron. The fresh-air opening in the outer wall should be protected against the entrance of insects by a copper screen, of fine mesh, and the latter protected from breakage by a stouter screen of galvanized iron wire.

In connection with this report upon the toilet rooms, I would state that the general arrangement of the ventilating ducts, flues and registers in this building is not good, and the eighth grade room has no provision, other than that of opening the windows, for securing a change of air in the room. A galvanized sheet iron flue should be constructed in the northeast corner of this room, and extend from the floor of the room to a point in the belfry, and on a level with the openings in the sides of the same. The area of this flue should be not less than three square feet, and the base of the same should be enlarged slightly so as to permit of a register plate with an area somewhat larger than that of the flue proper.

A brief visit to the High School building revealed the fact that the fresh-air ducts in the basement are placed in the most undesirable locations, viz., the toilet rooms and chemical laboratory. Being constructed of wood, as would naturally be expected, many openings were found in the ducts through which foul air from the rooms in which they are located could gain access to and contaminate the fresh-air supplies. These ducts, including the radiator enclosures, should be of galvanized sheet iron, and made absolutely air-tight, from the fresh-air openings outside to the points where they are connected with the vertical warm-air flues.

There are a number of iron doors at the bases of brick flue stacks in the basement, evidently intended for the purpose of cleaning out the flues. Some of the doors were found to be open at the time of my visit, but the bases of the flues were filled with broken bricks, etc., to such an extent that further examination of the flues could not be made in the limited time at my disposal. If the flues to which the iron doors are attached are for the ventilation of school rooms, the doors should be kept closed so that air from the toilet rooms and chemical laboratory cannot find its way into the flues, and from thence, when the draft might be sluggish or reversed, into the school rooms. If, on the other hand, these openings communicate with flues for the ventilation of the basement rooms, and there is no connection between these flues and the vent flues of any rooms on the floors above, the iron doors should be taken off and registers inserted in their place.

The examination, in detail, of the ventilating flues, etc., of this building was not attempted, but it was found that the warm-air registers are not in the best locations for securing proper ventilation of the rooms, and, being in the floors, are liable to become receptacles for considerable quantities of dust.

Respectfully submitted,
(Signed) THOS. S. AINGE,
Sanitary Engineer.

INSPECTION OF SCHOOL BUILDING AT IMLAY CITY.

[Division of Sanitary Engineering.]

July 29, 1907.

F. W. Shumway, M. D., Secretary State Board of Health:

Dear Doctor—In accordance with the request of the Board of Education of the village of Imlay City, on July 25, I visited that locality and conferred with members of the Board of Education and Village Council relative to the disposal of sewage from the High School building.

It was proposed to take out the Smead Dry Closets, install water closets in their place, and construct a sewer with an outfall into Belle River, west of the school building. To the plan for disposing of the sewage, considerable opposition was offered, and very properly too, because the river is not a proper or suitable outlet for the crude sewage from even a single dwelling, much less from a building of the proportions of the schoolhouse.

The proposition to substitute water closets for the Smead Dry Closets is commended, and it is recommended that individual siphon wash down closets, with seat action flush, such as are made for school use, be installed in preference to any other type of closet.

It is also recommended that the present urinal be done away with, and a good porcelain enameled urinal, in the form of a trough, fastened to the wall, and automatically flushed, be substituted for the same.

The usual provision for water closet accommodation in schools is one water closet for every twenty-five boys and one closet for every fifteen girls.

In dispensing with the Smead Dry Closets, it will be necessary to continue the use of the ventilating ducts under the closets, or else provide a separate vent flue to the roof from each school room in the oldest portion of the building; but before the Smead closets are torn out, and the openings in the ducts made good, the filth now in the ducts should be burned up, the residue removed from the building, and the ducts thoroughly cleansed. To secure even a fair movement of air in the rooms ventilated by the smead system, it will be necessary to operate the flues just as though the Dry Closets were still a part of the system, that is, the main vent stacks will require to be heated, and all doors or other openings communicating with the vent flues or ducts, other than vent registers in the school rooms, will require to be kept tightly closed. It is my opinion, however, that, owing to the limited sizes of the ventilating flues in the new addition, and the downward and tortuous course followed by the air in the ducts and flues in the old part of the building, the ventilation of the entire building will be very inadequate.

The only available outlet for the sewage from the proposed water closets, urinal, wash basins, etc., is the Belle River, and in order that the water in the same may not be fouled by the sewage, it will be necessary to purify the sewage before it enters the river. This can be accomplished by the installation of a septic tank and accessories in the line of the sewer at a point near the west line of the school lot. The plans and specifications for the sewer and purification plant should be prepared by an engineer thoroughly familiar with this class of work, and the janitor and other persons directly interested should be instructed by the engineer how to operate the plant, in addition to which full written directions for caring for the apparatus should be filed with the Secretary of the Board of Education.

The enforced construction, at considerable expense, of a long line of sewer and a purification plant for the proper disposal of the sewage from one building only, together with the fact that fifty per cent of the inhabitants of the village are using water from the public water supply but have no means for disposing of sewage and waste water from their dwellings and other buildings other than by the highly improper method of cesspools or by surface drainage, are points which should be brought prominently before the citizens of the locality, with the view of an early installation of a sewer system for the village.

Respectfully submitted,
(Signed) THOS. S. AINGE,
Sanitary Engineer.

INSPECTION OF SCHOOL BUILDING AT ALMONT.

[Division of Sanitary Engineering.]

July 29, 1907.

F. W. Shumway, M. D., Secretary State Board of Health:

Dear Doctor—In accordance with the request of the board of Education of the village of Almont, on July 26, I visited that locality and made an inspection of the school building.

The warm-air and vent flues and registers for the four large rooms are well located for securing the proper ventilation of the rooms, and are of sufficient capacity for fifty-one pupils in rooms on the first floor and forty-five pupils in rooms on the second floor.

The vent flues are provided with steam coils for accelerating the draft in same, and the flues are continued separately to the attic, but are there improperly connected with common flues.

The fresh air supplies are taken from outside the building, and the fresh air is conducted to the heating stacks in wooden ducts, the dampers in which were found to be closed and, I was informed, had been closed for the past ten years, thus cutting off the fresh air supplies to the school rooms.

There are two small rooms on the west side of the building which are provided with small warm-air registers but which have no outlets for vitiated air. Under ordinary conditions and with ample ventilation, these rooms would accommodate twenty-five pupils each, but by reason of the fact that the rooms are much exposed to the prevailing winds, the ventilation would not be good during high winds, and the number of pupils should not exceed fifteen in each room. The vent flues for these rooms can be placed in the closets located at the West ends of the main hallways, and they should be arranged in the same manner as other vent flues in the building, with the exception that they should be carried *separately* to a main ventilator on the roof instead of being connected with a common flue in the attic.

I was informed by the janitor that a down draft sometimes occurs in the vent flues of the large rooms, and, if that is the case, it is probably due to the elevation of the main ventilators with respect to the roof. It would be well to raise the ventilators several feet so that the deflection by the roof of the prevailing winds cannot interfere with the draft in the flues.

The basement room which is used as a Chemical Laboratory was found to be very damp and unwholesome, and is considered a positive danger to the health of the pupils, not only in the chemical class but throughout the entire building. The basement of this building is not and cannot be made suitable for class purposes, and the practice should be discontinued forthwith. For the removal of the present damp and unwholesome condition, wherever necessary, the floors of the basement rooms should be well cemented, and the downspouts properly connected with tight drains which discharge a sufficient distance from the building to prevent seepage of water into the basement from this source.

There are many openings in the ceilings of the basement rooms through which undesirable air from the basement can find its way into the rooms above, and it is recommended that all such openings be plastered over.

There are no screens on the fresh-air openings, and it is recommended that they be provided—a copper wire screen, of fine mesh, and an outer screen of stout galvanized iron wire, to prevent the inner screen from being broken.

The steam boiler is too small for the work it is expected to perform, and the building has not been well heated, but the Board of Education are negotiating for a new and larger boiler. After its installation, there should be no further reason for shutting off the fresh air supplies, at least during school hours and with fresh warm air entering the rooms and a full head of steam in the accelerating coils in the vent flues, the ventilation of the building should be good, at least as good as can be expected with this method of ventilation.

For the purpose of providing a suitable room for the Chemical Laboratory, and, at the same time, more suitable rooms for the intermediate grade and for recitation, it is recommended that the west wall of the central portion of the building be extended farther west for a distance of at least fifteen feet. This would furnish a space on each floor about 26 feet by 34 feet, instead of 11 feet by 34 feet, as at present, and would be a valuable addition to the building. If this is done, it will be necessary to make the warm-air flues of these rooms larger then at present, and to provide vent flues uniform in size with the flues of the other rooms.

Respectfully submitted,
(Signed) THOS. S. AINGE,
Sanitary Engineer.

ADVICE RELATIVE TO THE CONSTRUCTION OF DRY EARTH CLOSETS FOR A SCHOOLHOUSE.

[Division of Sanitary Engineering.]

August 1, 1907.

My Dear Sir—Your letter of yesterday's date, in which you ask for information relative to the construction of dry earth closets, was received.

I am pleased to know that you intend to use sanitary closets in connection with your schoolhouse instead of the usual filthy and disease breeding common privies, and will give you all the assistance I can in planning the same.

If your present outhouses are in good condition, they might be equipped for use as earth closets at a moderate expense. The seats and risers should be taken out and impervious receptacles for excreta constructed as per sketch on page 43.

To facilitate cleansing of the receptacles, the cement should be troweled to a very smooth finish.

The wooden seats should be hinged so that the dry earth may be easily applied to the contents of the receptacles.

The doors at the rear of the receptacles should be free from battens or grooves on the inside, and should extend to a sufficient distance beyond the cement to keep out rain.

Before the closets are used, a layer of dry earth should be placed on the bottoms of the receptacles, and subsequent applications of dry earth should be frequent.

The outhouses should be well ventilated, by openings in the walls near to the roof, or by special vent shafts extending from beneath the seats to points above the roofs.

A necessary part of the outfit will be a receptacle for the storage of dry earth, and it will be necessary to lay in a good supply in the Fall. Loam is the best of all materials for this purpose, but where it cannot be obtained, sifted *coal* ashes may be used.

A special bulletin upon the subject of earth closets will be mailed to you as soon as received from the printers.

If we can be of further service to you in the matter of school sanitation, please let me know.

Very truly yours,
(Signed) F. W. SHUMWAY,
Secretary.

C. A. WILLIAMS,
Secretary Board of Education, Caledonia, Mich.

ADVICE RELATIVE TO OVERCROWDING IN PUBLIC SCHOOL ROOMS.

[Division of Sanitary Engineering.]

October 1, 1907.

Dr. B. C. Shaw, Rosebush, Mich.:

Dear Doctor—Your letter of Sept. 28, in which you ask for information relative to overcrowding in public school rooms, is before me.

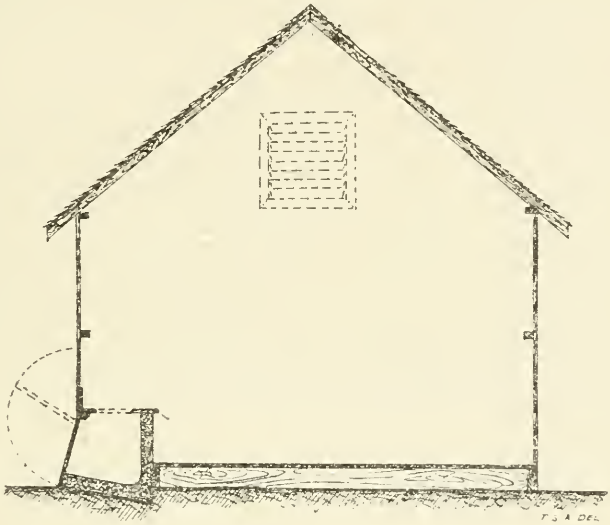
Authorities differ as to the proper amounts of floor area and air space per pupil in schoolhouses, the amounts ranging from 12½ square feet of floor area and 16½ cubic feet of air space to 25 square feet of floor area and 300 cubic feet of air space.

The class rooms in the best grammar schoolhouses built within recent years in Boston, and in many other cities in the United States, provide for a floor area of 16 square feet, and an air space of 216 cubic feet, for each pupil.

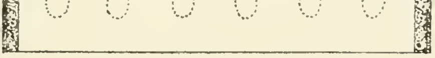
In the school law of the State of New York, provision is made for not less than 15 square feet of floor area and 200 cubic feet of air space, and these amounts are considered by this department to be the smallest which should be allowed in any schoolhouse.

Upon the general subject of overcrowding in schoolhouses, I cannot do better than quote from a report by Dr. R. C. Kedzie, which was published in the first annual report of this Board:

"In examining the schoolhouses of our State, the first prominent fault in construction observed was that the rooms are too small for the number of scholars, and as a consequence, overcrowding of the rooms. The lowest estimate would



SECTION ON LINE A.B., FIG 1.



PLAN OF RECEPTACLE.

require 300 cubic feet of space and 25 feet of floor space for each scholar. Thus a room 30 by 30 feet, and 12 feet high, might contain 35 scholars and the teacher; but this is a minimum space even for small scholars, and can be safely used only in connection with good ventilation. Some persons seem to think that small scholars require but small breathing space, but this is a grave mistake. Mr. Simon says: 'It is to be desired that laws and regulations as to overcrowding should not proceed on the assumption that children (to any reasonable extent) require less breathing space than adults. Against such assumption this fact has to be considered, that even healthy children, in proportion to their respective bodily weights are twice as powerful as adults in deteriorating the air which they breathe. I think it best that children and adults should be deemed to require equal allowances of air and ventilation.'

"The rapidity of the processes of waste and repair in childhood forbid the use of less space. Yet when we measure the size of schoolrooms and count the number of scholars, we see that the space for each scholar is much below this estimate.

"School officers do not defend the frequent practice of overcrowding, but offer as an excuse they have more scholars than their schoolrooms will accommodate. This might be offered as an apology for some temporary emergency, but not when the same overcrowding is continued year after year, and no adequate provision made for remedying the evil. The economy which hazards the health and life of the pupil to save the expense of additional buildings, is an economy which borders on recklessness or crime.

"The evil of this system is especially manifest in the stinting of floor space. The seats are placed as close as the scholars can conveniently sit, and the space for the alleys is as small as will allow the scholars to pass, single file. For the health of the scholar, the floor space is almost as important as the cubic space in the room. School officers often aim to increase the cubic space, while restricting the floor space, by making the rooms high between floor and ceiling. The lofty room only modifies one evil by introducing another, viz.: the necessity of climbing long flights of stairs."

Trusting this information will be of service to you, and that you will not hesitate to write this Department at any time we can be of service to you, believe me

Very truly yours,
(Signed) F. W. SHUMWAY,
Secretary.

INSPECTION OF BUILDINGS AT THE MICHIGAN HOME FOR FEEBLE-MINDED AND EPILEPTIC, LAPEER.

[Division of Sanitary Engineering.]

October 21, 1907.

F. W. Shumway, M. D., Secretary State Board of Health:

Dear Doctor—In accordance with your instructions, on October 16, I visited the Michigan Home for Feeble-Minded and Epileptic, at Lapeer, and made inspection of the ventilation and sewerage of a number of the buildings.

The ventilation of the cottages A. and B. is very poor, and the air supplies in serious danger of contamination by sewer air from openings in the floors of the basements, as will be understood by the following description:

The entire basements are utilized for the collection and warming of air, the indirect radiators being suspended from the joists above, and encased on the sides but not at the bottoms, these openings being left for the passage of air through the radiators and into the warm-air flues of the several rooms above. There are windows on each of two sides of the basements, from which abundant supplies of fresh air can be obtained, provided some of them are continually open.

There are two sets of shower baths in these basement fresh-air rooms which have drainage into the sewers through Bell traps, and these traps are dry most of the time and allow sewer air to enter the basements and mingle with the fresh-air supplies. There are also a number of soil pipes and connections in the basements, from the toilet rooms above, and in the event of defects or alterations in these pipes the air supplies would be still further contaminated.

The vitiated air from the first floor rooms is conducted, in wooden ducts, downward into and partly across the basements to the vertical vent flues, which are located alongside of the warm-air flues. Most of these wooden ducts are defective, and allow vitiated and dust laden air to escape into the basements, thus assisting in the contamination of the air supplies and, at the same time, weakening the draft in the ducts. In several instances, the vertical vent flues are pulling air out of the basements instead of from the rooms above.

The vitiated air is planned to be removed from the second floor rooms in much the same manner as in the first floor rooms, only that the ducts which connect the vent registers on the second floor with the vertical flues are formed by the spaces between the joists, and are probably more effective than the ducts from the first floor rooms.

The method of taking vitiated air out of these rooms by registers placed near to the outside walls is not good, for the reason that the fresh air from the warm-air flues will pass out of the rooms before it has made the circuit of the rooms, and leave comparatively dead air spaces in those parts of the rooms nearest to the fresh-air registers. Further, the two or more square turns which the vitiated air from each room has to make, together with the long distance which it has to travel, horizontally, through rough and uneven ducts, before it reaches the vertical flues, render the flow of air from the rooms at many times very uncertain, and the removal of a sufficient amount of air at any time impossible.

For the improvement of the sanitary condition of the cottages A. and B., the following changes and provisions are necessary, and should be carried out as soon as practicable:

The removal from the basements of the shower baths, and the proper sealing of all sewer openings in connection therewith or which may be in the floors.

The effectual separation, by brick walls, of those portions of the basements through which the soil pipes pass from those parts used as fresh-air rooms.

Plastered ceilings over every portion of the fresh-air rooms in the basements.

The removal of all vitiated-air ducts from the basements, and the sealing up of the openings through which the ducts entered the vertical flues.

The abolition of the vent ducts under the second floor rooms, and the sealing up of the openings connecting them with the vertical flues.

New openings in the vertical vent flues, with registers at the floor levels in each room.

The removal of all loose articles from the fresh-air rooms, and the thorough and frequent cleansing of the rooms.

Screens, of fine mesh, for the windows of the fresh-air rooms.

In all the buildings inspected, the floor drains are provided with Bell traps, and many of these were found to be dry. The use of these traps is very wisely prohibited in localities which have up-to-date plumbing codes, because they are easily broken, have very shallow water seals, and are unsealed whenever the covers are raised, which is often rendered necessary to permit of the ready flow of water to the sewers. And the covers once raised are usually left off for considerable periods of time. They are a constant source of danger and have nothing to commend them. It is recommended that the number of floor drains be reduced to the minimum, by dispensing with those which are not absolutely necessary, particularly those in basements where there are fresh-air supplies. The remainder should be provided with substantial traps, with deep seals. But a much better plan of dealing with the floor drains would be to sever their connections with the sewers and connect them with separate sets of pipes discharging on or into the ground at a safe distance from the buildings.

There are a number of downspouts on the outside of the Kitchen-and-dining-room building which end under the dormer windows, and which are evidently discharging sewer air into the rooms whenever the windows may be open. These downspouts, and any others which end below or dangerously near to windows, should be disconnected from the sewers and made to discharge into land drains or on the surface of the ground at a safe distance from the buildings.

There are a number of manholes in close proximity to the buildings, and many of them have grated covers which allow sewer air to flow out of the sewers and from whence it may be blown into the buildings through windows which may be open, and through the fresh-air openings. Children were found to be playing over one such manhole at the time of my visit, and this would seem to be a frequent custom. It is recommended that all manholes near to or on the sides of the buildings from which the wind most prevails, be provided with absolutely tight covers, and that the ventilation of the sewer be accomplished by the open manhole in the lane leading to the farm, south and east of the cottages A. B. and C., and by open manholes at such other points as may be considered safe. The provision of a large iron pipe, extended above some building at or near the upper end of the main sewer, would ensure an *inflow* of air at any manholes which might have grated covers, and, at the same time, secure much better ventilation than would be effected by openings at the surface only.

It is recommended that when the suggested changes have been made, that the plumbing of each building be tested by the peppermint test, as explained to Dr. Chamberlain, the Medical Superintendent, and if the tests should indicate defects at any points, a smoke test should then be given for the purpose of locating the defects.

Respectfully submitted,
(Signed) THOS. S. AINGE,
Sanitary Engineer.

VISIT TO THE EASTERN MICHIGAN ASYLUM, PONTIAC.

On February 24, 1908, The Sanitary Engineer of this Department went to Pontiac to confer with the Medical Superintendent and Superintendent of Construction of the Eastern Michigan Asylum relative to the sanitation of the new Chapel and Assembly Hall building. Several changes in the plans were recommended and the same were adopted. The report of this visit is included with the report on the examination of the plans for the building under consideration, printed on a preceding page.

INSPECTION OF SCHOOL BUILDINGS AT IONIA.

[Division of Sanitary Engineering.]

March 19, 1908.

F. W. Shumway, M. D., Secretary State Board of Health:

Dear Doctor—The following is a summary of conditions found to exist in the school buildings at Ionia, visited on March 18. and the buildings and rooms are treated in the order in which they were visited.

CENTRAL SCHOOL.

Fifth grade room.—This room is provided with but three windows, two of which are on the side and one at the rear of the scholars, and the lighting is very insufficient and poorly distributed. At the time of our visit, the three rows of desks nearest to the windows were fairly well lighted by the windows; the other desks were in semi-darkness when the electric lights, which were burning at the time, were turned off.

Fourth grade room.—The lighting of this room is also very deficient. and not nearly so well distributed as in the fifth grade room, two out of the three windows being at the rear of the scholars.

Third grade room.—The lighting in this room is also very poor, particularly in the case of the front rows of desks. There is, practically, no ventilation of the room, the openings intended for the removal of vitiated air being out of commission and evidently used as receptacles for the sweepings from the floor.

Seventh grade room.—The lighting of this room is also very poor. and one of the three windows is in front of the scholars, necessitating them facing the light. The vent register in this room was discharging cold and vitiated air into the room directly across the lower limbs of a boy who was seated quite close to the register.

Sixth grade room.—The conditions in this room were much the same as in the fifth grade room below.

West recitation room.—The lighting in this room is very bad and there was no air passing out of the room through the small register opening provided for the removal of vitiated air.

East recitation room.—The conditions in this room are much the same as in the west recitation room except that the draft in the vent flue of the east room was reversed, the vitiated air passing into the room.

Assembly room.—The lighting in this room is very poor and the scholars are compelled to face the light from two windows in front.

The ventilation of the rooms thus far considered is very poor and improperly planned. As a rule, the vent registers are improperly located, are much too small, and the vitiated air from some of the rooms is compelled to travel a long distance, through leaky wooden ducts under the floors, to the main vertical flue. The vent registers provided for the removal of vitiated air from the Assembly room, in particular, are absuredly small.

Annex, first and second floors.—In both these rooms, the desks face the wrong way, compelling the scholars to face a strong light. There is no provision for the removal of vitiated air from the first floor room and the provision for the ventilation of the second floor room is inadequate.

Annex, ground floor.—This room is partly below grade, and is absolutely without ventilation except what can be obtained by the opening of the windows. These windows are made to swing, and when they are open, there will be a draft of cold air across the seats. Unsafe, insanitary, and condemned for use for class purposes.

Basement toilet room for girls.—The closet fixture is in fairly good condition and is ventilated, but there is absolutely no privacy to the stalls or the room in which they are located.

Recommendations relative to the Central Building:

1. That the use of any rooms, for class or recitation purposes, above the second floor be discontinued.
2. That the area of glass surface in each room be increased to at least one-fifth the area of the floor space, that the main lighting be from the left side, and that the windows in front of the scholars be removed.
3. That the present main vent flue, running through the corridors, be dispensed with, and torn out so as to afford uniform width in the hallways.
4. That new ventilating flues be provided for each room, separate and distinct from the flues of any other room, and that these flues be so located that the registers for ingress and egress of air will be on the same sides of the rooms and as nearly opposite to the most exposed portions of the rooms as possible.
5. That the furnaces be dispensed with and the building heated by means of indirect radiators placed in special fresh-air rooms in the basement. The provision of a moderate amount of direct radiation on the most exposed sides of the larger rooms would be necessary to maintain a certain amount of warmth when the rooms are not occupied and the fresh air supplies cut off. The suggestion has been made for a central steam heating plant, located between the Central and High School buildings. This suggestion is commended, and if carried out would remove any element of danger from fire in the buildings and would be economical as compared with separate heating apparatus in each building.

HIGH SCHOOL.

Only the basement of this building was visited, and this was found to be occupied by the chemical and physical departments. The rooms are partly below grade and are not ventilated and should not be used for class purposes of any kind.

FOURTH WARD SCHOOL.

This building has been declared by the State District Building Inspector to be unsafe, in so far as the structure is concerned. It is also considered to be unsafe in so far as relates to the health of the occupants, and for the following reasons:

1. The ventilation of the entire building is very inadequate and improperly arranged, and the fresh-air supplies are in danger of serious contamination.
2. Portions of the floors are covered with matting beneath which is a considerable accumulation of dust, possibly infected.
3. The boys' toilet room in the basement is dark and unventilated, the floor

filthy from the overflow of water and urine, and several of the closets out of order.

4. There is no person constantly in charge of the heating apparatus and the temperature of the rooms will therefore be variable. At the time of our visit, the rooms were uncomfortably warm and the air very oppressive.

It is recommended that when this building is remodeled that it be heated by steam, and that separate and adequate ventilating flues be provided, in the same manner as recommended for the Central building. If this building cannot be remodeled along the lines suggested, making it both safe and sanitary, it should be abandoned for school purposes.

It is also recommended that the floor of this basement (and of the basements of other school buildings) be cemented, and the toilet room provided with proper light, ventilation and drainage.

Pending radical changes in this building, the matting on the floors should be immediately removed, the floors cleansed, the boys' toilet room cleansed and closets repaired, and a competent person engaged to look after the heating apparatus during school sessions.

Respectfully submitted,
(Signed) THOS. S. AINGE,
Sanitary Engineer.

EXAMINATION OF PLANS FOR NEW SCHOOLHOUSE AT READING.

[Division of Sanitary Engineering.]

May 2, 1908.

D. W. Fenton, M. D., Reading, Mich.:

Dear Doctor—Today we received from E. A. Bowd, the architect, a set of the plans of your new schoolhouse, and I hasten to write you regarding the same.

The general arrangement of the ventilating flues appears to be very satisfactory, but there are no details relative to the heating plant or the plumbing. When you have decided upon the details not shown in the plans, I shall be glad to advise you further if you will send me full particulars.

The plans show a crock drain from the area in the rear, with which the boiler blow off is connected, *apparently* connected with the sewer. The rain water drains are also shown to be connected with the sewer, but the specifications state that these drains will be connected with city storm drains. The latter is the proper method, but if the crock drains are to be connected with the sewer, the drain from the rear area should be of heavy cast iron pipes where it passes under any part of the building; the traps of same protected against evaporation; and the rain water conductors prevented from becoming ventilators for the sewer.

The plans do not show the waste pipe from the drinking fountain on the first floor, and it is recommended that it discharge into the storm drains and not into the sewer.

The two small water closet apartments for the teachers are not provided with means of ventilation, and it is recommended that openings be made in the partitions between these rooms and the large toilet room, so that air may pass from the smaller to the larger rooms.

For any school building, steam heat is best, and for a building of any size, the ventilation should be accomplished by forced draft. This method is recommended for your school building.

Trusting this information may be of service to you, and that you will not hesitate to write this Department at any time we can be of service to you, believe me

Very truly yours,
(Signed) F. W. SHUMWAY,
Secretary.

ADVICE RELATIVE TO THE DISPOSAL OF SEWAGE AT IMLAY CITY.

[Division of Sanitary Engineering.]

May 11, 1908.

James H. Hallock,' The Times Publishing Co., Imlay City, Mich.:

Dear Sir—Your letter of May 2 was received during the absence of our Sanitary Engineer, hence the delay.

As fifty per cent of the inhabitants of your village are using water from private wells, many of which are believed to be in danger of contamination from the leachings from cesspools and privies, the use of such methods of disposing of excreta in your village should be prohibited and the village authorities should build a sewerage system, at least for the buildings, on or near the main streets.

Under suitable conditions, the disposal of sewage from isolated buildings may often be safely accomplished by a septic tank and filtration, but this method of disposing of the sewage from your building is not recommended, because the outlet would have to be into the subsoil from which the private water supplies are obtained, and purification plants cannot always be depended upon to produce a germ free effluent. The fact that nothing but soapy or greasy water is to be disposed of is not a sufficient warrant for discharging such liquids into the subsoil, because there are several ways by which infection may find its way into a sewer by way of a sink or wash basin.

There is really no way by which you can safely dispose of the sewage from your building other than by a public sewer, with an outlet into the river, and, even then, the sewage should be purified before its discharge into the river.

If this Department can be of further assistance to you in this or any other matter pertaining to the public health, kindly let me know.

Very truly yours,
(Signed) F. W. SHUMWAY,
Secretary.

INSPECTION RELATIVE TO SEWERAGE AT BUCHANAN.

[Division of Sanitary Engineering.]

May 16, 1908.

F. W. Shumway, M. D., Secretary State Board of Health:

Dear Doctor—In accordance with your instructions, on May 14, I visited the village of Buchanan for the purpose of conferring with the local authorities relative to sewerage for the locality.

It was found that sewage is being discharged from a number of buildings on one side of Main Street into the creek nearby, while on the other side of this street, the sewage is discharged into cesspools. As the cesspools have become clogged, new cesspools have been made and some of the lots are practically honeycombed with these dangerous receptacles. There are also a number of privies erected over or on the banks of the creek and the excreta is thus removed as fast as deposited, or nearly so but to the detriment of the water in the creek, which is impounded at the mill below the village for power purposes and is also used for the watering of stock below the mill dam.

In view of the fact that, in some of the lots, there is little or no room for the construction of more cesspools, and for the reason that the discharging of sewage into the creek is liable at any time to be contested by the owners of land bordering on the creek below Main Street, to say nothing of the danger of such methods of disposing of excreta, the village authorities seem to be united in favor of proper and immediate measures for the disposal of sewage.

There is but one method which should be adopted for the disposal of sewage from this locality, viz., the construction of sanitary sewers and the purification of the sewage before its discharge into the creek. This method was explained to the members of the Village Council and to many other persons interested in the question, and it was suggested that the Council engage the services of an engineer, who has had considerable experience with purification plants, to make a survey and plan of the necessary sewers, septic tank and filtration beds.

The early construction of sanitary sewers, at least for the business section of the village; the installation and proper care of a suitable purification plant; and the prohibition of the discharging of excreta, or refuse, into the creek at any point, would relieve the village from the present dangerous condition, and should remove and prevent any possibility of damage to owners of land along the course of the creek.

Respectfully submitted,
(signed) THOS. S. AINGE,
Sanitary Engineer.

INSPECTION OF THE HIGH SCHOOL BUILDING AT BUCHANAN.

[Division of Sanitary Engineering.]

May 16, 1908.

F. W. Shumway, M. D., Secretary State Board of Health:

Dear Doctor—While in Buchanan, on May 14, relative to the question of sewerage for the village, upon the invitation of a member of the Village Council, I made a visit to the High School building to look over the ventilation of the same. It was found that, in many of the rooms, the vent registers are permanently sealed by sheet metal plates, behind the registers; that in the main High School room, the registers for the removal of vitiated air are placed some distance above the floor level; and that, in many instances, the vent registers were found to be too small for the work they are expected to perform. The result of this interference with the free and ample movement of air through the rooms is not only detrimental to the health of the scholars but is wasteful, because, in the absence of adequate means for the exit of cold and vitiated air, the fresh warm air cannot enter the rooms in sufficient quantity to maintain the proper temperature, and a considerable portion of the effectiveness of the heat generated is lost. If every room in the building was provided with a vent register, of ample size and at the floor level, communicating with a vent flue on an inside wall, and the vent flues extended *separately* to a point above the roof, there should be no difficulty in heating and ventilating the rooms of this building satisfactorily.

Respectfully submitted,
(Signed) THOS. S. AINGE,
Sanitary Engineer.

INSPECTION RELATIVE TO DRAINAGE AND SEWERAGE AT HARTFORD.

[Division of Sanitary Engineering.]

May 21, 1908.

F. W. Shumway, M. D., Secretary State Board of Health:

Dear Doctor—In accordance with your instructions, on May 18, I visited the village of Hartford, for the purpose of conferring with the local authorities relative to a nuisance and sanitary conditions in the village, generally.

It was found that a ditch, partly covered and partly open, constructed for the purpose of cutting off the water from the high land south of the village, has become too small for the amount of water which has been caused to flow into it from lands in the township of Hartford, with the result that the basements of a considerable number of buildings in the village are flooded. Some of the water is from land upon which the contents of cesspools has been emptied and some from Maple Hill Cemetery, south of the ditch.

A case of typhoid fever was found in close proximity to the ditch, and it is very apparent that the saturated condition of the subsoil is responsible for the contamination of the well upon the premises where the case exists and, possibly, of every shallow well in the village.

The foregoing facts were pointed out to the members of the boards of health of the village and township at a special meeting called for the purpose of considering the question of the abatement of the nuisance. Measures for the temporary abatement of the present dangerous condition were discussed, but it was pointed out to the village authorities that there could not be any permanent relief from the present insanitary conditions in the village until a system of sewers has been installed and until every shallow well and cesspool have been abolished. It was recommended that when a system of sewers is constructed, the sewage be purified before its discharge into a natural watercourse. By doing this, the length of the outfall sewer could be shortened, because, instead of discharging the crude sewage into the river, as contemplated, the purified sewage could be discharged into the creek, at the nearest point, without objection. The meeting was adjourned until May 20, when reports were to be made by legal authorities as to the powers and responsibilities of the village and township boards in the abatement of the nuisance in question.

While in the village, I obtained information relative to four recent cases of typhoid fever, one of which has recovered, and none of which had been reported to this Department. Both the village and township health officers were absent from the village at the time of my visit, so there was no opportunity for me to confer with them relative to the status of typhoid fever in their localities recently.

Respectfully submitted,
(Signed) THOS. S. AINGE,
Sanitary Engineer.

EXAMINATION OF PLANS FOR A PROPOSED NEW SCHOOL BUILDING FOR THE CITY OF CORUNNA.

[Division of Sanitary Engineering.]

June 6, 1905.

F. W. Shumway, M. D., Secretary State Board of Health:

Dear Doctor—In accordance with your instructions, I have examined the plans, prepared by E. A. Bowd, of Lansing, for the proposed new school building for the city of Corunna, and find accommodation for not more than 235 pupils in the primary department, 120 grammar school students, and 120 high school students.

There is nothing in the plans or specifications relative to the nature of the proposed method of heating the building, which the specifications state, is not to be included in the general contract. The plans evidently contemplate a fan system of heating and ventilation, which is the only method by which a building of the size and character of that under consideration can be properly ventilated, but provision should be made for warming the toilet rooms next to the outer walls when the fan is not running.

On the second floor plan, the vent flue of the class room adjoining the chemical laboratory is not indicated, as in the case of the other rooms, but the architect stated that the flue nearest to the door of the room was intended for the purpose.

On page 51 of the specifications, it is stated that:

"All heating registers to have frames, slats, and face plates.

"All ventilating registers to have face plate only."

The provision of slats for the heating registers is unnecessary, because, as soon as the fan stops, the draft in the heating flues, if any, will be slight.

The provision of slats for the vent flues is desirable, because, as soon as the fan stops, and until the temperatures of the air in the vent flues and of that out of doors are nearly equal, the draft in the vent flues will continue, and if the draft can be stopped during the night, by the closing of the vent registers, the rooms would not be cooled down so much and it would not take so long to warm up the rooms again in the morning.

According to the recognized standards for the lighting of school rooms, in which the lighting is all from one side only, the lighting of nearly half of each of the two assembly rooms will not be good, that is, any seats which are located more than twenty-four feet from the windows will not be well lighted.

In the basement plans, provision is made for living and sleeping rooms for the janitor, but the architect stated that it was not now the intention to make use of any part of the basement for living purposes. In general, basement rooms are not considered suitable, from a hygienic standpoint, for living or sleeping rooms, and the change in the plans in this regard is commended.

Respectfully submitted,
(Signed) THOS. S. AINGE,
Sanitary Engineer.

OPINION RELATIVE TO THE USE OF BASEMENT ROOMS IN SCHOOLS FOR CLASS PURPOSES.

[Division of Sanitary Engineering.]

June 8, 1908.

Philip A. Bennett, care of Welch and Bennett, Clare, Mich.:

Dear Sir—Your letter of June 4, relative to the use of basement rooms for school purposes, is before me.

Generally speaking, basement rooms in school buildings are very undesirable for class purposes, and for the following reasons:

1. The ceilings are usually too low for the proper distribution of light, and to afford sufficient breathing space. A height of at least ten feet is necessary for proper lighting and for the installation of the heating apparatus.
2. The floors and outside walls are usually in direct contact with the ground, thus rendering possible the passage of ground air and moisture into the rooms.
3. It is usually difficult to properly heat and ventilate such rooms.
4. Where the heating apparatus is located in the basement, or where, as is usual, some part of the basement is made use of for toilet or storage purposes, the air of the basement throughout would be liable to be contaminated by dust and effluvia to such an extent as to render it undesirable for breathing.
5. A basement room which can be made fairly sanitary and fit for use for school purposes is a rare exception, and even under the best conditions, such rooms are very inferior to rooms on a higher floor; and the money expended in putting such rooms into fair condition would go a long way toward the construction of a sanitary addition above the grade.

From your description of the basement of your school building, it would seem that, in so far as relates to the construction and surroundings, the basement of your school building is an exception to the general run of school buildings in this State; nevertheless, in view of the excellent financial condition of your school district, and in consideration of the health of the present and future school population, I would strongly advise you to consider the abandonment, in the near future, of the basement rooms for class purposes and the erection of additional school rooms entirely above the grade.

If this Department can be of further service to you in any matter pertaining to the public health, it will give me pleasure.

Very truly yours,
(Signed) F. W. SHUMWAY,
Secretary.

[Practically the same information as that contained in the foregoing letter was sent to the Superintendent of Schools of Fennville Village about one week previous.]

REPORT RELATIVE TO THE EQUIPMENT OF AND WORK IN THE LABORATORY OF THE STATE BOARD OF HEALTH, FISCAL YEAR, 1908.

BY M. L. HOLM, M. D., PH. G., PH. C., BACTERIOLOGIST.

A copy of the act establishing the laboratory of the State Board of Health was printed on pages 39 and 40 of the annual report of this Board for the year 1907.

In order to carry out the provisions of this act, a laboratory has been equipped with such apparatus and appliances as was deemed necessary to conduct the routine examinations and analyses as provided in Sec. 3.

The dominant idea in equipping and organizing the work of this laboratory has been to extend to the health officers and physicians in smaller cities and country districts certain laboratory facilities available in the larger cities, and at the same time be prepared to conduct such special investigations as may be required by the various prosecuting attorneys and the State Board of Health.

For the convenience of local health officers and in view of obtaining certain information in a uniform manner, as well as facilitating the work in the laboratory, mailable outfits for such pathologic material as is most commonly submitted, have been prepared and distributed to the various health officers upon application for same. Because of the limited funds available for the support of the laboratory, it has not been possible to supply as many such outfits to certain health officers as they have desired; but we have endeavored to distribute our limited facilities as equally as possible to the various localities. Health officers have often taken the privilege of mailing tubercular sputa, diphtheritic membranes and other infectious material to this laboratory in special packages improvised by themselves to meet the occasion. Few physicians seem to be conversant with the stringent regulations of the Postoffice Department governing the admission to the mails of cultures and specimens of diseased tissues. Special attention is directed to the exactitude of the requirements for packing. It should be noted that the postal service will handle infectious material only when destined to United States, state or municipal laboratories. Specimens intended for medical laboratories other than public institutions, and specimens not packed and labeled according to specified directions, when sent to such public institutions, must be transmitted by messenger or express. Specimens of diseased tissues or other infectious material, if thoroughly sterilized and rendered non-infectious, may be mailed in the usual way.

SECTION 495, POSTAL LAWS AND REGULATIONS.

DISEASED TISSUES—WHEN MAILABLE.

1. Specimens of diseased tissues may be admitted to the mail for transmission to United States, state or municipal laboratories, only when inclosed in mailing packages constructed in accordance with this regulation.

2. Liquid cultures, or cultures of micro-organisms in media that are fluid at the ordinary temperature (below 45° C. or 113° F.) are unmailable. Such specimens may be sent in media that remain solid at ordinary temperatures.

INDORSEMENT ON PACKAGES.

3. On the outside of every package of diseased tissues admitted to the mails shall be written or printed the words "Specimen for Bacteriologic Examination. This package to be treated as letter mail." No package containing diseased tissues shall be delivered to any representative of any of said laboratories until a permit shall have first been issued by the postmaster-general certifying that said institution has been found to be entitled, in accordance with the requirements of this regulation, to receive such specimens.

MANNER OF PREPARATION FOR MAILING.

4. Packages used for conveying through the mails pathologic specimens for bacteriologic examination for diagnosis in cases of suspected diphtheria, tuberculosis, and other communicable diseases, shall be constructed and prepared as follows.

MOIST SPECIMENS. VIAL OR TUBE.

a. The receptacle for moist specimens of diseased tissues shall be a strong glass vial or test tube having a capacity not greater than two drams. The vial shall be covered and made water-tight by the use of a metal screw cap and a rubber or felt washer which has been immersed in melted paraffin, or, if a test tube be used, it shall be covered with a tightly fitting rubber cap.

INNER BOX.

b. The vial or test tube shall be placed inverted in a circular tin box, which shall be made of I. C. bright tin plate, and have flush or countersunk bottom and soldered joints and not be smaller than one and one-eighth inches in diameter and three inches long, nor larger than two and one-quarter inches in diameter and five and one-half inches long. This box shall be closed by a metal screw cover and a rubber or felt washer, or tightly fitting metal sliding cover, and shall be so packed with absorbent cotton, closely laid, that the glass or test tube contained therein shall be evenly surrounded on all sides by cotton.

OUTER TIN OR WOODEN BOX.

c. The tin box shall be placed inverted inside of a larger tin box similar to the one already described, which should snugly receive the specimen box. On the inside of the sides and bottom of this outer box there shall be a lining of compressed paper not less than three-sixteenths of an inch in thickness. This outer tin box shall be closed by a metal screw cap and a rubber or felt washer. This outside box may also consist of hard wood, in the form of a block with a cylindrical hole bored in one end and extending to within not less than one inch of the opposite end; the open end to be closed with a wooden or metal screw cap with a rubber or felt washer. Or the outside box may be a cylindrical wooden box having a screw cap and washer. The thickness of the sustaining part of the wooden tube must be not less than one-quarter of an inch and be lined same as the tin box.

DRY SPECIMENS. TEST TUBE.

d. The receptacle for dry specimens of diseased tissues shall be a glass test tube, three inches in length and one-half inch in diameter. This test tube shall be enclosed in a circular tin box similar to those already described but measuring two and one-quarter inches in diameter, and five and one-half inches in length, and be lined on its sides and bottom with compressed paper not less than packed in cotton, and the box shall be closed by a metal screw cap one-quarter of an inch in thickness. The test tube shall be closely packed in cotton, and the box shall be closed by a metal screw cap and a rubber or felt washer.

TUBERCULOSIS.

Since the discovery of Bacillus Tuberculosis by Robert Koch in 1882 the microscopic search for this organism has constituted a prominent part of the work of every municipal and clinical laboratory the world over. The value of an early diagnosis for efficient treatment is universally recognized. So important to the patient's welfare is the timely diagnosis of this disease, that no conscientious physician will neglect to avail himself, in suspicious cases, of every known method for its correct diagnosis whenever necessary. Through the efforts of numerous able experimenters, many biological as well as chemical aids have been introduced for the early diagnosis of tuberculosis. While some of these possess great value as diagnostic aids and are often commendable, up to the present time the only finding upon which an absolute diagnosis of tuberculosis can be made, is the demonstration of the Bacillus Tuberculosis.

Outfits complying with the U. S. Postal Regulations are supplied to health officers from the laboratory upon request. This outfit is primarily intended for the transmission of sputa, but may be used for material from suspected tubercular lesions in parts of the body other than the lungs. Specimens of urine and feces to be examined for tuberculosis should be mixed with an equal volume of five per cent phenol in water and sent by prepaid express.

DIRECTIONS FOR COLLECTING AND SENDING SPUTA.

(1) Remove the sputum bottle. Label it with the patient's name, address and the date and give it to the patient.

(2) Direct the patient to spit directly into the bottle, without getting sputum on the outside.

(3) The first sputum raised from the lungs in the morning is to be preferred. Saliva, vomitus and hemorrhagic material should not be collected. Purulent and cheesy sputum most frequently contains the bacilli.

(4) Get directly from the patient or family the required information and fill out in full the blank on opposite side of this slip.

(5) When the patient returns the sputum bottle, the physican should carefully examine the outside for sputum carelessly deposited upon it, and if any is found, wash it off with carbolic solution. He should test the stopper to insure that there is no leak; see that the opposite side of this blank is properly filled, repack both as they were when first opened and send prepaid by express or mail to this laboratory.

(6) In cases where unusual delay, before sending sputa, is unavoidable, or when sending long distances, we recommend the addition of equal volume of five per cent carbolic acid. This does not interfere with the microscopical examination and prevents decomposition.

RECORD CARD FOR EXAMINATION FOR TUBERCLE BACILLI.

LABORATORY OF MICHIGAN STATE BOARD OF HEALTH, LANSING.

Date of Collecting Sputum, ..., 19..
Physician's Name ...., M. D., Address ....
Health Officer's Name ...., M. D., County .... Address......
Patient's Name ...., Address ....
Occupation ...., Age ...., Sex ....
Nationality .... Birthplace ....
Coughing how long? ...., Location of Lesions ....
Have previous Microscopic examinations been made? ....
When .... Results ....
Remarks ....
....

SPACE BELOW RESERVED FOR LABORATORY FINDINGS.

....
....
....
Rec'd ...., Ans'd ...., M. D.
Bacteriologist.

[OVER.]

REPORT BLANKS FOR EXAMINATION FOR TUBERCLE BACILLI.

Michigan State Board of Health
Laboratory
Report on Sputum Examination

Lansing, ..., 19..

..................................., M. D.
....

Dear Doctor—The examination of sputum from ....
....
....
..............................., taken ...., 19.., gives the following results:
Tubercle bacilli ....
....
....
....

.................................., M. D.
Examiner.
.................................., M. D.
Director.

NOTE.—The demonstration of the presence of tubercle bacilli in the sputum proves conclusively the existence of tuberculosis, but the absence of tubercle bacilli, or the failure to find them microscopically, does not exclude the existence of the disease. The disease can only be probably excluded if repeated examination of the sputum fails to show the presence of tubercle bacilli.

RECORD OF SPUTA EXAMINATIONS.

Laboratory of Michigan State Board of Health.

No	Health officer.	Address.	Rec'd.	Ans'd.	Result.	Physician.

DIPHTHERIA.

The laboratory investigations are of value in diphtheria in several particulars, chief among which may be mentioned: (a) differential diagnosis between diphtheria and other throat affections; (b) confirmation of positive clinical diagnosis; (c) locating bacilli carriers not showing symptoms of the disease; (d) determination of duration of quarantine after recovery. In diphtheria, bacteriology has been of highest importance. Bacteriology has given to the clinician in this disease not only a method of diagnosis but has succeeded in preparing specific bacterial products which are capable of entirely preventing the injurious effects of diphtheritic poisons upon the body. Antitoxin, if properly and timely administered, will save, practically, every case of diphtheria, but being specific in nature, the remedy acts only where the infection is due to the bacilli of Löffler and Klebs. This fact, as well as the quarantine measures employed in diphtheria cases, makes it extremely important that each case be correctly diagnosed.

While there may still be a few men in the medical ranks who are able to diagnose diphtheria with their nose, men of the highest authority, with wide clinical experience, agree that it is impossible to accurately diagnose all cases of diphtheria without the use of bacteriologic methods. Also that by no means all of the cases of clinical diphtheria are true diphtheria, and that many cases diagnosed diphtheria on clinical grounds only are found to be caused by some other organism when examined bacteriologically.

Out of 8,920 specimens examined for diphtheria at Chicago Department of Health during the years 1907-8, Bacillus Diphtheria was found only about 2,050 times or in 23 per cent of the specimens. One hundred ninety-seven specimens from cases of suspected diphtheria examined in our laboratory resulted positive in 86 instances, or in about 44 per cent of the cases.

The work of Park and Morse showed that out of 5,340 suspected cases, 67.5 per cent were true diphtheria.

Woodhead states that 3,000 out of 12,172 cases admitted into the Metropolitan Asylums Board Hospitals and certified as suffering from diphtheria, offered no bacteriological evidence of diphtheria.

Josias and Tollemer found that only 580 out of 709 hospital cases which had been diagnosed as diphtheria on clinical grounds showed bacteriological evidence of the disease. The following table quoted by Dr. G. S. Graham-Smith from the observations of the Massachusetts State Board of Health for the nine years ending March 31st, 1905, is of interest because it represents a number of cases which are sufficiently high to give a good average; also because it is compiled from cases submitted by a large number of physicians representing the rank and file of the state.

Clinical diagnosis.		Bacteriological diagnosis.			Percentage of true diphtheria.
	No.	Positive.	Negative.	Doubtful.	
Positive........	4,113	2,555	1,504	54	61.6
Negative......	2,340	421	1,880	39	18.0
Doubt ul......	2,971	982	1,942	47	33.0
Not given......	2,031	734	1,247	50	36.1

Parties who have been exposed to diphtheritic infection may carry large numbers of diphtheria bacilli in their throat or nose and yet not show any symptoms of the disease. Likewise the bacilli may persist after recovery from true diphtheria for an extremely variable period, the average being from one to three weeks, but in exceptional instances the organism may persist for several months. It is not possible to choose any arbitrary time limit by which a patient may with any reasonable certainty be considered free from infection after an attack of diphtheria, and the duration of the quarantine should always be governed by the bacteriological findings.

During the acute stage of diphtheria, the number of Klebs-Löffler bacilli is high and a reliable swab which will show a large number of the organisms may be obtained with relative ease. When it is about time to release from quarantine, however, the conditions are usually quite different. The diphtheria bacilli, if not entirely absent, will generally be few in number and these few probably concealed in various crypts and crevices where they may be easily missed and perhaps caught on swabs taken at later dates. As a result of this, many writers have been led to advise two, three, four and even five negative swabs before releasing from quarantine. These extra precautions may be very good and no doubt at least two negative swabs are advisable. But with the limited facilities at hand and while aspiring to better things, the health officer should remember that at least one negative swab from a recovered case of diphtheria before releasing from quarantine, is much better than a release without any knowledge whatsoever concerning the bacterial flora of the patient's throat. For collecting specimens to be examined for diphtheria, we have adopted an outfit which consists of a test tube containing a sterile swab on an aluminum wire, placed in a suitable mailing case. The material to be collected as follows:

DIRECTIONS FOR TAKING SPECIMEN FROM THROAT FOR BACTERIOLOGIC EXAMINATION.

Remember swabs are sterile when received and avoid contamination.

No specimen will be examined unless taken in accordance with printed directions and blank on opposite side properly filled.

Do not use disinfectant in the throat before taking specimen.

Place the patient in a good light. If a child hold properly, depress tongue and rub the cotton swab gently but freely against margin of any visible exudate. Rotate the swab so that all portions of the cotton come in contact with the throat.

If no exudate can be seen pass the swab far back and rub freely against the mucus membrane of the pharynx and tonsils.

Replace the swab in glass tube and insert the cotton plug.

Fill out blank on other side, wrap the tube carefully in cotton, roll up in this slip and insert both in mailing case, as received (*Prepay Postage at Letter Rates*) and mail at once to this Laboratory.

All reports will be mailed immediately after examination. Reports by telephone or telegraph are at physician's expense and will be given only when so requested.

For our work this method gives more satisfactory results than where tubes of Löffler serum are sent to the various physicians for the following reasons: (a) The outfit is mailable and may be transmitted as dry specimens (Postal Laws and Regulations, 4. d); (b) The swabs are permanent and do not deteriorate (tubes of Löffler serum keep only a short time in the average room); (c) there is no growth between the bedside and the laboratory where the temperature is not under control and may be more favorable to other organisms than to the diphtheria bacilli: (d) fresh media is inoculated at the laboratory with every swab and the inoculation is done by a skilled bacteriologist; (e) in about 90 per cent of positive cases, diagnosis can be made by direct smear from the swab without waiting for cultural results, which requires eight to fifteen hours for development; (f) direct smear from the swab enables us to study various organisms which do not develop upon the usual culture media.

RECORD CARD FOR EXAMINATION FOR DIPHTHERIA BACILLI.

Laboratory of Michigan State Board of Health
Lansing
Examination for Diphtheria

Physician's name ...., M. D. Address ....
Health Officer's name ...., M. D., County........, Address......
Patient's name ...., Address ....
Age ...., Sex ...., Color ...., Nativity..........
Membrane .... Location ...., Color ....
Duration of Disease ...., Temperature ....
Probable Source of Contagion ....
Clinicial Diagnosis .... Has Antitoxin been Administered?......
Is this 1st, 2nd or 3rd specimen from this case?..................
Previous results? ....
Shall report be sent by telephone or telegraph at your expense?......
Date and hour of collection ....
Remarks ....
....

SPACE BELOW RESERVED FOR LABORATORY FINDINGS.

B. Diphtheria .... Streptococci ....
B. Influenza .... Contamination ....
Micrococcus Catarrhalis ....
Pneumococci ....
Staphalococci ....
.................................., M. D.
Examiner.

Rec'd ...., Ans'd ....

REPORT BLANK FOR EXAMINATION FOR DIPHTHERIA BACILLI.

Michigan State Board of Health
Laboratory
Report on Examination of Throat Specimen

Lansing, ..., 19..

........................, M. D.

....

Dear Doctor—The examination of specimen from ....
....
....
Taken by you ...., 19.., gives the following result:
Bacillus Diphtheria, present .... absent ....
....

....

....

...., M. D.
Examiner.

...., M. D.
Director.

NOTE.—Diphtheria bacilli may be found in the throats of persons apparently not suffering from the disease.

DIPHTHERIA CASES should not be released from quarantine before absence of Klebs-Löffler bacilli has been determined by laboratory examination.

LABEL USED FOR SENDING EMPTY MAILING CASES TO PHYSICIANS.

Laboratory of Michigan State Board of Health
Lansing, Michigan

Dr...

....

......................., Michigan

SPECIMEN FOR BACTERIOLOGICAL EXAMINATION
This Package to be Treated as Letter Mail when Returned to the Laboratory

RETURN LABEL.

Stamp
Here

Laboratory of Michigan State Board of Health
Lansing
Michigan

SPECIMEN FOR BACTERIOLOGICAL EXAMINATION
This Package to be treated as Letter Mail

TYPHOID FEVER.

This is a disease extraordinarily variable in its manifestations. There is, perhaps, no other infectious disease subject to so large a percentage of diagnostic errors in the hands of the average clinician. Some errors in the diagnosis of typhoid fever are inevitable even under the most favorable conditions and often such errors are fully justifiable. But when a physician in a certain locality is able to abort seventy-five per cent or more of his cases before the end of the second week, and at the same time reports about ten cases to every one reported by other practitioners with equally large practice in the same locality, it is time for him to seek out the confines of his conscience and learn to discriminate between facts and fancy. There are eight cardinal signs for consideration in the diagnosis of typhoid fever, viz.:

1. The continuous fever, with a gradual step-like onset.
2. The splenic tumor.
3. The rose spots.
4. The relative bradycardia.
5. The Bacillus Typhosus in the blood or urine.
6. The Gruber-Widal serum test.
7. The Diazo-reaction of Erlich.
8. The leukopenia.

The first four of these will of course be observed by the clinician at the bedside, the remainder must be sought for in the laboratory.

The typhoid bacilli may be cultivated from the blood or urine in a large percentage of cases, and where successfully performed proves conclusively the existence of typhoid fever. Unfortunately, however, their isolation is tedious and difficult and requires ready laboratory facilities near at hand, so the method is impractical except in the larger hospitals.

Erlich's Diazo-reaction is present in the urine of patients suffering from typhoid fever in over 95 per cent of the cases, but the reaction is also present rather frequently in other diseases, such as measles, scarlet fever, diphtheria, septicemia, erysipelas, acute tuberculosis, etc. The leukopenia of typhoid may be as low as 3,000, but there are usually about 5,000 leukocytes per cubic millimeter of blood. An examination of the white cells in the blood is often of great value in the differential diagnosis of typhoid, especially since most of the common diseases from which typhoid is to be distinguished show a marked leukocytosis. The condition may be well studied from smear preparations of the patient's blood upon a glass slide properly stained. Since the decrease largely affects the polynuclear cells, there is a relative increase in other types of white cells. The polynuclear cells may fall below 50 per cent and the lymphocytes will show a relative increase.

The Gruber-Widal reaction.—When the blood of a patient suffering with or convalescent from typhoid fever is mixed in proper dilution with a culture of typhoid bacilli, and the mixture placed in a thermostat, the bacteria which previously clouded the media uniformly are observed to clump together into little masses, settle to the sides of the test-tube and gradually fall to the bottom until the fluid is almost clear. In a control test, on the contrary, to which no active serum has been added, the fluid remains uniformly cloudy. If the reaction is observed in a hanging drop, it is seen that the addition of the active serum first produces an increased motility of the bacteria, which is in a variable period followed by a gradual formation of clumps and complete cessation of motion. The intensity of the reaction is variable and complete agglutination may take place any where between five minutes and two hours, depending upon the dilution of the blood and the amount of agglutinin present in the serum.

Gruber was first to thoroughly study and appreciate the bacterial agglutinins, and at the Congress for International Medicine in 1896 he announced that he had discovered the reaction in typhoid convalescents. The significance of the reaction as a diagnostic aid was first pointed out by Widal 1896, who showed that the reaction appears at a relatively early period of the disease. Hence, in acknowledgment of the labor of these two authors to whom we owe the discovery and introduction of the agglutination phenomenon, we speak of the "Gruber-Widal reaction."

Since the discovery of this reaction and its value as a dignostic agent, it has been introduced and employed in almost all municipal laboratories. Agglutinins were for a time regarded as strictly specific and it was thought that serum derived from a typhoid infection would agglutinate typhoid bacilli and no others. It has been found, however, that such a serum would frequently agglutinate somewhat related organisms, though not usually to so high a degree. In spite of this so-called group agglutination, the Gruber-Widal reaction still remains one of the most valuable aids which is practically applicable in the laboratory diagnosis of typhoid fever.

The methods of observing the reaction are macroscopic and microscopic. The macroscopic reaction is produced by adding serum or blood in proper proportion to fresh cultures of typhoid bacilli and observing the clumping of and subsequent precipitation of the organisms. It has been discovered that emulsions of dead bacilli can be used for the reaction and this observation has led certain manufacturers to prepare and supply such emulsions of dead typhoid bacilli to practicing physicians for use in the diagnosis of typhoid. Such emulsions, while hardly as satisfactory as the fresh culture, have the advantage that they may be kept for a considerable length of time; whereas a culture would have to be freshly prepared each time the same was to be used.

The microscopic method is employed in practically all public laboratories and is to be preferred where proper laboratory facilities are at hand. The test is made by diluting the suspected blood about fifty times with a 24-hour bouillon culture of typhoid bacilli. From this is prepared a hanging drop on a concave glass slide, which is incubated, together with a properly prepared control for one hour, and examined under a microscope. Clumping of the bacilli with cessation of motion constitutes the reaction. Typho-agglutinins usually appear in the patient's blood as early as the fifth to the eighth day of the disease. They are present in 95-97 per cent of all cases of typhoid fever, and may persist for from two to thirty years in diminishing quantity after recovery.

Several methods for collecting the blood have been devised by different laboratory workers. I have found dry blood collected upon an aluminum sheet, essentially as described by Dr. F. F. Westbrook, Laboratory Director of Minnesota State Board of Health, most satisfactory. Return envelopes containing sheet aluminum and directions for collecting blood are sent to health officers on request.

DIRECTIONS FOR COLLECTING BLOOD FOR WIDAL'S TEST.

Cleanse thoroughly the skin of the finger tip or lobe of the ear. Pierce with a sterile needle.

Place several drops of blood on the enclosed foil. *Allow to dry* at room temperature *(do not heat it)* then fold over foil to protect blood. Enclose folded aluminum foil, together with this data blank, properly filled, in accompanying envelope and mail to the Laboratory.

Reports are mailed daily. Reports by telegraph or telephone are at physician's expense and will be given only when so requested by the physician.

RECORD BLANK FOR EXAMINATION FOR TYPHOID FEVER.

Laboratory of Michigan State Board of Health
Lansing
Blood Examination for Typhoid Fever

Date ...., 19..

Physician's name ...., Address ....

Health Officer's name .... { County .... / Address ....

Patient's name ...., Address ....

Patient's age ...., Sex ...., Nativity ....

Day of disease ....

Symptoms {
Diarrhea?................ Epistaxis?...................
Temperature?............ Status Typhosis?.............
Iliac Tenderness?.......... Tympanitis?..................
Rose Spots................ Enlarged Spleen?.............

Chemical Diagnosis ....

Has patient had typhoid before? .... When?............

Suspected source of infection ....

Result of previous laboratory examination ....

Remarks ....

....

....

....

Reserved for Laboratory

No.................

Result ....

....

Rec'd ...., Ans'd .... Bacteriologist.

REPORT BLANK FOR EXAMINATION FOR TYPHOID FEVER.

Michigan State Board of Health
Laboratory
Report on Blood Serum Reaction

Lansing, ..., 19..

.........................., M. D.

....

Dear Doctor—The specimen of blood from ....

....

....

taken ...., 19.. When tested by the "Gruber-Widal Reaction" *for Typhoid Fever* gives .... results.

....

....

....

.................................., M. D.
Examiner.

.................................., M. D.
Director.

NOTE.—In cases where negative or doubtful report is received, physicians should send new specimens twice a week until diagnosis is made.

"A negative result, obtained with the serum of a case of suspected typhoid, affords a presumption against the diagnosis of typhoid fever, but this is only a probability, especially if the examination has been made in the first few days of the disease. The examination should then be repeated during the next few days. The presumption that a case in which a negative result has been obtained is not typhoid, becomes correspondingly stronger as the stage of the disease becomes more advanced."—WIDAL.

RECORD BLANK FOR EXAMINATION OF TYPHOID FEVER.

RECORD OF BLOOD SERUM REACTIONS

Laboratory of Michigan State Board of Health

No.	Health Officer.	Address.	Rec'd.	Ans'd.	Result.	Reported by.	Physician.

POTABLE WATER.

Drinking waters are naturally divided into three main types according to their source, viz., surface waters, shallow wells and deep or artesian wells. Nature furnishes under no conditions a water which is absolutely pure, and in studying the potability of a given water supply and deciding upon its sanitary quality, the findings upon which our final conclusion is drawn are essentially relative, and based upon a comparison with what should be the average findings in a water of that type in the same locality. Following is an average analysis of a water from each of above mentioned types, the chemical analysis being expressed in parts per million:

	Surface water.	Shallow well.	Artesian well.
Source	Lake Superior	Holland, Mich.	Lansing, Mich.
	CHEMICAL.		
Depth	......	30 ft.	250 ft.
Color	None	None	None
Odor	None	None	None
Turbidity	None	None	None
Sediment	None	None	None
Nitrogen as free ammonia	.005	.000	.140
Nitrogen as albuminoid ammonia	.040	.030	.020
Nitrogen as nitrites	.001	.000	.000
Nitrogen as nitrates	.010	.800	.000
Chlorine	3.000	10.000	7.000
Oxygen consumed	1.000	.600	1.300
Alkalinity	40.000	150.000	305.000
Hardness	40.000	160.000	295.000
Ignited solids	35.000	180.000	280.000
Iron	.000	.050	.600
	BACTERIOLOGICAL.		
Colonies per cc growing at 22° C	7	2	0
Colonies per cc growing at 40° C	0	0	0
Acid forming colonies at 40° C	0	0	0

It is very common for us to receive a water for analysis with the request that an opinion be returned as to its potability, without any accompanying information whatsoever as to its source. Sometimes such information is even intentionally withheld in view of rendering the desired report unprejudiced in character. Such action is a serious hindrance to the laboratory expert making accurate deductions and often certain findings are uninterpretable in the absence of important local facts, and it becomes necessary to delay the report until the necessary information comes to hand.

In determining the potability of a water the quality and quantity of contaminating substance is to be considered, as well as the chemical and biological changes that may have occurred since such contaminating substance was introduced. The inorganic constituents are indestructible, and if soluble will remain in the water practically unchanged. The carbohydrates and fats are in time oxidized into carbon dioxide and water. The proteins are gradually broken down into ammonia and in turn oxidized into nitrites and finally into nitrates, in which condition they remain in surface or shallow well water unless taken up by vegetation. In waters of the artesian well type, owing to the lack of oxygen in the soil at that depth, the nitrogen contents have undergone reduction and are found as ammonia. Any marked variation from such normal findings always gives rise to suspicion and is to be considered in the interpretation of the laboratory results.

Following is an analysis of the liquid portion of a crude sewage, together with a water of each of above mentioned types illustrating the result of sewage contamination, the chemical examination being expressed in parts per million.

	Sewage.	Surface water contaminated.	Shallow well contaminated.	Artesian well contaminated.
Source	Gobleville	St. Clair Riv.	Zeeland	Lansing
CHEMICAL.				
Depth	......	......	30 ft.	250 ft.
Color	Grayish yellow	None	None	None
Odor	Putrid	Musty	Musty	Faint
Turbidity	Marked	None	None	None
Sediment	Considerable brown	Trace	Trace	None
N. as free ammonia	20.000	.050	1.050	.180
N. as albuminoid ammonia	9.000	.090	.200	.040
N. as nitrites	.000	.005	.025	.000
N. as nitrates	.000	.020	6.500	.000
Chlorine	120.000	7.000	50.000	10.000
Oxygen consumed	98.000	3.400	2.700	1.800
Alkalinity	550.000	95.000	230.000	305.000
Hardness	600.000	90.000	270.000	275.000
Ignited solids	700.000	105.000	300.000	295.000
Iron	1.100	.400	.100	.600
BACTERIOLOGICAL.				
Colonies per cc growing at 22° C	180,000	85,000	6,200	400
Colonies per cc growing at 40° C	10,000	2,200	1,200	55
Acid forming colonies growing at 40° C	8,000	900	35	27
B. Coli present	Yes	Yes	Yes	Yes
Sewage Streptococci present	Yes	Yes	Yes	Yes

It is a well known fact that contaminated waters have a tendency to undergo self-purification. Such purification may be considered complete when: (1) the oxygen consuming power has returned to normal; (2) the nitrogen contents have assumed the form characteristic of the type of water in which it is contained; (3) the total number of bacteria is no longer excessive and specific sewage bacteria have entirely disappeared. After such purification is complete the water may be considered again safe for drinking purposes, providing the resulting products of such self-purification be not excessive in quantity and in themselves objectionable.

The relation of contaminated drinking water to the various intestinal diseases and typhoid fever is too often illustrated to require special comment. When a public water supply becomes contaminated the result of such contamination is often appalling, and no precaution should be neglected in protecting the public from such terrible epidemics as is so often recorded in the history of the past. And when a certain water supply is not absolutely protected from all sources of contamination, frequent examinations should be made and the result of such examinations published in order to properly forewarn the people of the impending danger.

In collecting samples of water for examination, every precaution should be observed in order to prevent accidental contamination. We hope in the near future to be able to supply health officers with suitable outfits to be used when water samples are submitted for examination. In the absence of such outfits, and while same are in preparation, we have been in the habit of furnishing the following blank which has been found fairly satisfactory when the instructions were properly carried out:

DIRECTIONS FOR COLLECTING AND SENDING WATER SAMPLES FOR ANALYSIS.

Select a clear glass bottle of at least one-half gallon capacity, rinse it out thoroughly and fill with boiling hot water, let stand for 10 to 15 minutes, pour out water and put the stopper in place. *Do not again remove stopper before sample for analysis is to be collected.*

When collecting from a pump or faucet, allow the water to run about 5 minutes before taking sample. When collecting from a lake or river immerse the bottle about 1 foot before removing stopper. Fill the bottle nearly to the top and pour out the contents, shaking while emptying. Then fill the bottle to within about 2 inches of the top, leaving a little air space, put in the stopper and fasten it securely. *Pack in ice* and ship by express to this laboratory.

A report upon any given water sample is a scientific deduction, based upon local conditions and environments as well as the laboratory findings, and all available information should invariably accompany the sample to be examined.

Health officer's name ....
Town ...., County.........................
Location of well ....
Open, ... Closed. .... Flowing, ...
Kind of Curbing, ... Depth, ... Is it in use?......
Character of soil, ... Slope of soil, ...
Proximity to possible sources of contamination.....................
Reason for Analysis ....
If a river or lake, describe relation to sewers, etc., ...
Date of collecting sample, ...
Remarks ....
....
....

[All samples sent in should be marked plainly "Laboratory of State Board of Health, Lansing, Mich." Express must be prepaid.]

PLEASE DO NOT PUT WAX ON STOPPERS. TIE THEM DOWN.

It is absolutely necessary that all samples intended for bacteriological examination should be well iced from the time of collection until they reach the laboratory, in order to prevent bacterial changes during shipment. I have repeatedly received uniced water samples yielding from 50,000 to 200,000 colonies per cubic centimeter, without showing other evidence of contamination.

Cramer examined the water of a lake, left standing in a vessel at room temperature, with results as follows:

	Micro-organisms per cc.
At time of collection	143
After 24 hours	12,457
After three days	328,543
After eight days	233,452
After seventeen days	17,436
After seventy days	2,500

Frankland in a similar experiment obtained the following results:

Hours.	Number of Germs per cc.
None	1,073
Six	6,028
Twenty-four	7,262
Forty-eight	48,100

Personally I have often had occasion to verify these results and have found that in addition to the rapid increase in the total number of bacteria present, there is a corresponding decrease in the pathogenic organisms present, which are under unfavorable conditions and are destroyed by the antibiotic action of the common saprophytic bacteria to which such conditions are more favorable. Thus B. Typhosus, B. Coli and sewage streptococci may be numerous in the freshly collected sample, and if such a sample remains uniced at room temperature for a few days before reaching the laboratory, they may be entirely absent. I emphasize these facts because certain health officers, unfamiliar with the bacteriology of water, have seemingly considered it an imposition on our part when they have been requested to pack their samples in ice, or had improperly collected samples rejected. It should also be remembered that direct sunlight has strong germicidal properties and should not be allowed to act upon the water longer than is absolutely necessary. Samples of water have often been received in earthen jugs and fruit jars. Such containers are objectionable, essentially because they cannot be properly cleaned, and contamination from an improperly cleaned container is frequent in such receptacles, and may at times lead to the condemnation of an uncontaminated water supply.

A form of report and a specimen record card for use in connection with water analysis are shown below.

FORM OF REPORT FOR SANITARY WATER ANALYSIS.

State Board of Health, Michigan

Laboratory Department

Office of the Secretary, Lansing, ...

Dear Doctor—The sample of water received from .... address ...., taken from ...., collected ...., 1909, and received at the laboratory ...., 1909, has been examined with the following results:

Color ....
Odor..............................
Turbidity ....
Sediment............................
N. as Free Ammonia ....
N. as Alb. Ammonia ....
N. as Nitrites ....
N. as Nitrates ....
Chlorine ....
Oxygen consumed ....
Alkalinity ....
Hardness ....
Ignited solids ....
Iron ....

} Parts per 1,000,000.

BACTERIOLOGICAL.

Colonies per cc. at Room temp ....
Colonies per cc. at Inc. temp. ....
Presumptive tests for B. Coli.
Gas production on Lactose Bouillon.
1 cc. ....
25 cc. ....
Acidity of fermenting bulb ....
Turbidity of fermenting arm ....
Indol production ....
Red colonies on Litmus Lactose Agar ....
Specific organisms identified.
....
....
Potability ....
Remarks, ...

Respectfully yours,

......................, M. D.
Bacteriologist.

RECORD CARD FOR SANITARY WATER EXAMINATIONS.

Specimen of Water. No. ....
Rec'd (Date) Ans'd (Date)
Name........................ Address..............................
Examination Chemical and bacteriological.
Remarks..
....

Report Chemical
Color....................
Odor....................
Turbidity...............
Sediment................
N. as free ammonia........
N. as albuminoid ammonia..
N. as nitrites.............
N. as nitrates............
Chlorone.................
Oxygen consumed.........
Alkalinity...............
Hardness.................
Ignited solids............
Iron.....................
Parts per 1,000,000

Bacteriological
Colonies per cc at room temp........
Colonies per cc at Inc. temp.........
Presumptive tests for B. Coli.
Gas production on Lactose B.
1 cc.......................
25 cc.....................
Acidity...................
Turbidity.................
Indol production.............
Red colonies on L. L. A.......
B. Coli......................
Potability...................

MISCELLANEOUS EXAMINATIONS.

Under the heading of miscellaneous is classed the various examinations for which we have no special blanks. Up to the present time our records show such substances as milk, urines, disinfectants, toxicological and other cases of a medico-legal nature, tumors, stomach contents, embalming fluids, post-mortem examinations, mineral waters, examinations for gonococci, treponema pallida, malaria, rabies, anthrax, etc. It is not possible to here go into detail as to the proper methods of collecting and transmitting all the various substances which we may be called upon to examine under this heading. For such information the health officer is referred to the various works on pathology and bacteriology, where the necessary information can usually be obtained.

We have often received milk samples shipped to the laboratory uniced. Such milk samples have generally been sour when received, in which condition no information of value can be obtained from a bacteriological examination. We are often asked by parties submitting such samples whether the milk contains any germs of typhoid, measles, scarlet fever, diphtheria or smallpox. To anyone familiar with general bacteriology it is obviously seldom possible to give any direct answer to such questions, even under the most favorable conditions. The critical observer may note that in the case of some of the above mentioned diseases, no specific organism has ever been demonstrated. This fact, however, does not materially add to our difficulty, for the number of bacteria in milk is generally so high that the isolation of such organisms as B. Diphtheria and B. Typhosus is impossible under ordinary circumstances and conclusions must be drawn in an indirect way, being based upon general information and findings rather than finding of the specific etiologic factor.

The following table quoted from Newman illustrates the numerical bacteriological variation in milk kept at various temperatures:

When received, specimen No. 1 contained 3,000 bacteria per cc. and specimen No. 2 contained 30,000 per cc.

Temperature.	No.	Time which elapsed before making the test. 24 hours.	48 hours.	96 hours.	168 hours.
32° F. (0° C)….	1	2,400	2,100	1,850	1,400
	2	30,000	27,000	24,000	19,000
39° F. (4° C.)….	1	2,500	3,600	218,000	4,200,000
	2	38,000	56,000	4,300,000	38,000,000
42° F. (5.5° C.)…	1	2,600	3,600	500,000	
	2	43,000	210,000	5,760,000	
46° F. (6° C.)	1	3,100	12,000	1,480,000	
	2	42,000	360,000	12,200,000	
50° F. (10° C.)…	1	11,600	540,000		
	2	89,000	1,940,000		
55° F. (13° C.)…	1	18,800	3,400,000		
	2	187,000	38,000,000		
60° F. (16° C.)…	1	180,000	28,000,000		
	2	900,000	168,000,000		
68° F. (20° C.)…	1	450,000	25,000,000,000		
	2	4,000,000	25,000,000,000		
86° F. (30° C.)…	1	1,400,000,000			
	2	14,000,000,000			
94° F. (35° C.)…	1	25,000,000,000			
	2	25,000,000,000			

It will be noted in this table that there is a decline in the total number of bacteria in both samples when kept at the freezing point during the first 168 hours. At all higher temperatures, there is a marked increase in the number of organisms, which is materially accelerated as the body temperature is approached.

The numerical bacterial content will usually average higher in the larger than in the smaller cities. This is essentially owing to the fact that the milk is older when delivered and not kept at a sufficiently low temperature during storage and transmission. This is well illustrated by a series of counts on samples of market milk, made by myself in Chicago, February, 1907, and market milk samples collected in Lansing, February, 1909.

Lansing.		Chicago.	
Lab. No.		Lab. No.	
951	31,000	21,122	400,000
952	3,000,000	21,123	7,200,000
953	45,000	21,124	15,000,000
954	32,000	21,125	800,000
955	15,000	21,126	80,000
956	2,000	21,137	7,500.000
957	350,000	21,138	4,900,000
958	28,000	21,139	7.300,000
959	230,000	21,140	15,000,000
960	75,000	21,141	12,200,000
961	38,000	21,142	1,200,000
962	115,000	21,143	600.000
963	22,500	22,108	400,000
964	6,000,000	22,109	1,500,000
974	10,000	22,210	1,800,000
989	9,000	22,211	450,000
998	1,420,000	22,212	180,000
999	375,000	22,213	225,000
1,003	15,000	22,214	1,200,000
1,004	10,000	22,215	700,000
1,005	6,100	22,216	900,000
Average	564,219	Average	3.787,381

The Lansing samples were collected by customers and with the least possible delay brought to the laboratory and plated. The Chicago series is taken consecutively from my laboratory records and represents a fair average from about a thousand counts made during the Spring months of 1907.

RECORD BLANKS FOR MISCELLANEOUS EXAMINATIONS.

Specimen of ....

No....................

Rec'd .... Ans'd ....

Name .... Address.....................

Examination ....

Remarks ....

....

Report ....

....

....

....

....

....

....

....

....

....

....

....

A statement of expenses incurred in the equipment and operations in the laboratory during the fiscal year 1908 may be found on a subsequent page of Part I of this report of the Secretary.

CAMPAIGN AGAINST TYPHOID FEVER IN MICHIGAN.

For the purpose of securing the cooperation of local health officials in a widespread movement for the prevention of typhoid fever in this State, copies of the following letter and tabular statement have been mailed to the health officers of 549 localities in which typhoid fever has been unusually prevalent in past years, and with each letter was mailed a copy of a special bulletin, entitled "A Practical and Sanitary Outdoor Closet."

State Department of Health, Michigan,
office of the secretary, lansing.
[Division of Sanitary Engineering.]

July, 1907.

.............................,
Health Officer,
.........................., Mich.

Dear Doctor (or Sir):

By a recent compilation of typhoid fever, in Michigan, for the eighteen years, 1889-1906, it was found that, in many localities, the disease has been prevalent during the whole or a considerable portion of this period, and in other localities quite prevalent in recent years, indicating a probable local and continuing cause. A statement relative to the reported typhoid fever in your locality during this period is enclosed herewith.

Typhoid fever can and should be restricted and prevented; and it is earnestly requested that your local board of health, under the powers granted by Sections 4412 and 4466 of the Compiled Laws of 1897, make a special effort to locate and remove the conditions which favor the continuation of this disease in your locality.

For your guidance, the following lines of action are suggested:

Careful investigation relative to the construction and condition of privies and cesspools in the locality, and to their location as possible sources of contamination of the water supplies; to be followed, if necessary, by a general cleaning up.

In localities having no sewers, recommend, and, whenever the occasion will warrant such action, require, the substitution for each privy of a good dry earth closet, an illustrated description of a simple form of which is sent to you under separate cover.

In localities where there is a public water supply and sewers, and there is danger of contamination, by leachings from cesspools or privies, of public or private water supplies, require the closing of cesspools, and the substitution for each privy of a water closet with sewer connection.

Analyses of suspected waters for drinking or domestic purposes, and the closing of all wells, the water in which is known to be unsafe.

The education of the families of those sick from typhoid fever, relative to the proper methods of disinfecting the discharges of the sick persons, and the contents of privy pits, or cesspools, of houses where the disease is present.

If this Department can be of service to you in securing better sanitary conditions in your locality, please do not hesitate to call upon us.

Thanking you in advance for any assistance you may render, in the manner indicated, and in keeping this Department informed as to unusual conditions in your locality affecting the public health,

Very truly yours,
F. W. SHUMWAY,
Secretary.

THE REPORTED NUMBER OF CASES AND DEATHS FROM TYPHOID FEVER IN THE .... OF ...., COUNTY OF .... IN THE EIGHTEEN YEARS, 1889-1906.

Years.	Cases.	Deaths.	Years.	Cases.	Deaths.	Years.	Cases.	Deaths.
1889	....	....	1895	....	....	1901	....	....
1890	....	....	1896	....	....	1902	....	....
1891	....	....	1897	....	....	1903	....	....
1892	....	....	1898	....	....	1904	....	....
1893	....	....	1899	....	....	1905	....	....
1894	....	....	1900	....	....	1906	*	*

The average annual death rate for typhoid fever, for the State as a whole, in the seventeen years, 1889-1905, was 25.8 deaths per 100,000 of the population, or about one death in every four thousand inhabitants, and the average annual death rate for this disease for the locality named above during the same period was .... deaths per 100,000.

REMARKS:—

That this movement for the suppression of typhoid fever has been and will be productive of much good may be gleaned from the following copies of letters which have been selected from the responses to the foregoing communication from this Department. The copy of a newspaper clipping which follows the letters shows one result of an investigation, begun in Benton Harbor, immediately following the receipt of the communication in question.

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* The compilation for 1906 not being completed, these figures are subject to change.

THE BOARD OF HEALTH.

Detroit, Michigan, August 26, 1907.

Dr. F. W. Shumway, Secretary State Board of Health, Lansing, Mich.:

My Dear Doctor—Your letter of August 19th with reference to the status of typhoid fever in the State and particularly in Detroit, is at hand and I am much interested in what you have said. I am entirely in accord with your views on the subject and am very anxious to carry out the suggestions you make. In writing my annual report for the fiscal year ending June 30, 1907, my attention was called to the fact that diphtheria, scarlet fever and smallpox are on the decrease in Detroit whereas tuberculosis, pneumonia and typhoid are increasing. In other words we are doing good work with the "notifiable" diseases but not so much with those that are not reported. I have always been of the opinion that the first step in the prevention and restriction of communicable diseases is their notification to the local health officer. Knowing where the cases are, he can get busy. I am afraid, as I have often told you, that the only way for us to get the cases reported in Detroit is to have the diseases that we wish reported specifically mentioned in the state law. However, pending such legislation we must be doing all we can to restrict these diseases. As for typhoid, I have in my annual report, called the attention of the Board of Water Commissioners to the possible contamination of our water supply and have recommended that they take steps looking towards the installation of a municipal filtering plant. I do not believe, however, that *at present* our water is at fault. I believe with you that for the most part the disease is spread by flies and that the privies are the foci of infection. We have been working to get rid of privies ever since I have been in office but have been endeavoring to clean them out one by one. That is a slow process. In June of this year the Board of Health passed an order bearing upon this subject of which the following is a copy:

ORDER NO. 14.

"In pursuance of the power and authority vested in this board, it is hereby ordered:

That all privies, and all privy vaults of every description, whether in buildings or in outhouses, and whether or not connected with the public sewer system situated within the city of Detroit, shall be condemned and abolished and closets of a proper and sanitary design as approved by the Board of Health connected by properly constructed plumbing and drains with the public sewer system of said city, installed in the place and stead of such privies and vaults. The construction and use of privy vaults hereafter within said city, except in cases where connections cannot be made with the public sewer system, is expressly prohibited.

Persons who violate any of the provisions of this order will be prosecuted as provided by law.

The Board of Health,
Detroit, Mich., June 21, 1907."

You can see from what I have written, that we have been mindful of the danger but perhaps we have not been active enough. Your letter has stirred me up and I am now more anxious to "do things." We will push our regulation against privies and I hope to publish in the daily papers, if the Board of Health will agree to it, some points on the disinfection in cases of typhoid fever. In this way we will reach the people whether the cases are reported or not. Again we will with renewed vigor, get after the manure piles which are the breeding places for flies.

I am thankful to you for your communication and will let you know if you can be of service to us in our campaign against typhoid fever.

Yours very sincerely,
(Signed) GUY L. KIEFER,
Health Officer.

DEPARTMENT OF HEALTH,

CITY OF KALAMAZOO.

Kalamazoo, Mich., August 20th, 1907.

Dr. F. W. Shumway, Secretary State Dept. of Health, Lansing, Mich.:

Dear Doctor—Your letter with accompanying statistics and recommendations arrived this morning, and has been read with considerable interest. While the facts contained in the statistics are a matter of record in this department, we have had no compilation similar to that which you furnished. In regard to the sanitary precautions recommended, I take pleasure in informing you that work very similar to that suggested, has been in progress in the city for the past ten days. For a number of years there has been a city ordinance, providing against other than water tight vaults in a certain area immediately surrounding the water works. This ordinance has never been enforced, although the danger to the water supply from this source has been recognized for years and each health administration, for years past has urgently recommended the improvement of the conditions surrounding the wells. About ten days ago, following the unfavorable report from Ann Arbor of a water analysis, upon the recommendation of the Health Department, the city council authorized the immediate cleaning up of this district, which at the same time was enlarged by an ordinance to cover a wider area coinciding with the water shed, as defined by the city and consulting engineers. Throughout the entire district all vaults are ordered cleaned and filled and draw pans of galvanized iron substituted, the plan being to have these pans cleaned at regular intervals by the city scavenger service. On account of this cleaning, all scavenger work in the city was ordered discontinued until the reform desired had been accomplished in the water works district. The work is progressing effectively under the control of the Health Department and under the immediate supervision of a regular police officer on special duty. By an action of the council last night, the initial expense of the cleaning will be borne by the property holders, who will also be subjected to the annual cost of $2.50 for the regular cleaning of the cans. The cost above that figure, of filling the vaults, providing the cans and policing this district will be borne by the city. This is merely a temporary arrangement and a new sewer system will be probably installed to accommodate this low lying district. A sewage pumping station must be built, and engineers are working on plans for the same at present. The station is a necessity, owing to the fact that this land lies below the present sewerage system, which, therefore, cannot be employed for sanitation in this area. In the mean time the water now used in the city is chiefly from another not ordinarily used well, the analysis of which is good, and the citizens are advised to boil the water. Kalamazoo has water which in its normal condition of purity is of excellent quality, and we hope soon to be able to restore the drinking water to a condition of which the city can be proud.

* * * * * * * * * * * *

Respectfully yours,
(Signed) DAVID J. LEVY,
Health Officer.

DR. A. LEENHOUTS.

HOLLAND, MICH.

September 5, 1907.

F. W. Shumway, M. D., Lansing Mich..

Dear Doctor—Regret to report three cases of typhoid, as herein enclosed, one of which died.

I have carefully gone over the situation and feel quite safe in concluding that the cause lies in the use of water from private wells.

Of the five cases occurring here this summer, in every instance the patient had been using well water. Early in the summer I directed attention to the danger of using any but city water, in the local papers, but people are slow to believe, failing to appreciate that sanitary conditions rapidly change in a rapidly growing town.

Am glad to say that the members of the local board are now thoroughly aroused, and we have succeeded in arranging and adopting a new set of Rules and Regulations, a copy of which I shall be pleased to forward to you within a few days.

Your circular letter pertaining to typhoid has been very helpful, and I dare say that if we can keep up the present spirit for awhile in this town, typhoid fever will be rooted out, or rather prevented, and tuberculosis very much reduced.

Yours respectfully,
(Signed) A. LEENHOUTS,
Health Officer.

AFTER THE BATH, DRINK THE WATER.

BENTON HARBOR FINDS BATH HOUSE HAS BEEN CONTRIBUTING TO CITY'S WELLS.

Benton Harbor, Mich., Sept. 13.

The fact that Benton Harbor's water supply has been contaminated for months was disclosed at the council meeting last night. A special committee appointed by the council discovered that sewage water from a mineral bathhouse had gotton into the city wells. The bathhouse adjoins the city pumping station.

The report laid before the council stated that a patient at the hospital, after bathing, had thrown soiled towels into the pipes, clogging them. The drainage water backed up and overflowed the ground.

The city wells are only 40 feet deep, hence impure water from the bathhouse easily got into the wells.

The investigation also disclosed that the bathhouse is not connected with a sewer and that drainage water flows into a cesspool and then drains off into the ground. No epidemic has broken out, although there are one or two cases of typhoid fever in the city.—Detroit News, Sept. 13, 1907.

CLEANING-UP DAY.

Following the custom of preceding years, a letter was sent to the mayor of each city and the president of each village calling attention to the need for a proclamation in each locality setting apart a certain day for a general cleaning up of the cities and villages. A copy of this letter follows. So far as can be learned from the newspapers, the request met with a very general response.

STATE BOARD OF HEALTH, MICHIGAN,

OFFICE OF THE SECRETARY, LANSING.

April 28, 1908.

A CLEANING-UP DAY.

Every man, woman, and child should be proud of the place they call home. A clean attractive home is a living monument to its occupants. It should be the aim of every household to make that home, inside and out, the cleanest place on God's footstool. Housecleaning time is an old, well established, and wise custom. Following the closed-up conditions of the long winter months, the entire furnishings and apartments need a thorough cleansing.

This work should not be confined to the house alone. The yard as well should receive attention. During the winter months garbage accumulates more or less about every home. The ash piles, kitchen refuse, and manure piles should be removed early each spring. Neglect to do this not only results in untidy and unattractive homes, but insanitary as well, for if these accumulations are left until the coming of the spring rains and warm weather, they become a menace to health. The leachings from these piles find their way into the subterranean channels from which we draw our drinking water.

Will every citizen in our commonwealth make a resolution that he will do his part in this work; then follow the resolve up with actual deeds. Getting started on any new undertaking is what worries people most. It is like getting out of bed on a cold winter morning—so hard to start. Yet when once fully decided, so easy to carry out. Just a throwing off of the bed clothing, and plunging into useful activity.

It is just this way about *cleaning-up* and *beautifying our homes.* Lying back and dreaming about it will not do it. Every man and woman interested *must get to work.* If every householder will take this appeal home to himself and resolve to do his part, and then do it, we shall have taken a good step forward, not only in beautifying but in improving the health conditions of our homes.

To this end this Department would respectfully recommend to the mayors of our cities, and presidents of villages, that they issue a brief appeal, at an early date, calling for all to unite in an effort to make more clean and attractive that place we call *home.*

—State Department of Health, Lansing, Michigan.

PLACARDS RELATIVE TO THE RESUSCITATION OF THE DROWNED.

A copy of the following letter was sent to health officers and others in about eight hundred localities in the State, and about five thousand copies of the placard "What to do and how to do it" were sent with these letters.

As the placard in question is about to be revised, it will be printed in the annual report for 1909 instead of at this time.

STATE BOARD OF HEALTH, MICHIGAN,

OFFICE OF THE SECRETARY, LANSING.

June 1, 1908.

..............................,

......................................, Mich.:

My Dear Sir—Drowning causes the loss of some 300 lives annually in Michigan. Some of these can be saved if prompt action is taken at the time the accident occurs.

To this end this Department issues instructions—"What to do and how to do it." We are sending to you under separate cover some of these placards. You will do your community a favor by posting these up at such places in your jurisdiction as are indicated on the placard, and at such other places as in your judgment they may be of use.

We shall be glad to supply copies of this placard to any person that can make proper use of them. Thanking you in advance for your interest and help, I remain

Very truly yours.
(Signed) F. W. SHUMWAY.
Secretary.

DANGEROUS FIREARMS AND FIREWORKS.

For the purpose of securing a reduction in the numbers of accidents and fatalities usually associated with the observance of Independence Day, a copy of the following statement relative to the record of accidents and fatalities following the celebration of the Fourth of July in Michigan in 1907 was sent to the mayor of each city and the president of each village in the State shortly before the Fourth of July, 1908:

State Board of Health, Michigan,

OFFICE OF THE SECRETARY, LANSING.

SPECIAL.

While celebrating the glorious "Fourth of July" and recounting the deeds of our illustrious dead, why not think about protecting the living from unnecessary suffering and death.

RECORD FOR 1907 IN MICHIGAN.

Fifty-one accidents reported as follows:

Firecrackers	22
Cannons	6
Revolvers and toy pistols	7
Powder	6
Blank cartridges	1
Dynamite caps	4
Torpedoes	1
Roman candles	3
Sky rockets	1
Total	51

Number of deaths from above causes, seven or more. Comment is unnecessary.

June 18, 1908. —State Department of Health.

CLEANING FLOORS.

For the purpose of answering letters of inquiry received at this office relative to cleaning floors, the following circular was prepared during the fiscal year 1908:

CLEANING FLOORS.

The following preparations are recommended for use in the daily sweeping of schoolrooms. They have all been tested, and are known to possess practical value. They are adapted to the cleaning of all exposed floors (cars, halls, churches, etc.) as well as those of schoolrooms. The ingredients being so inexpensive and easily secured, while the work insures thorough cleaning, should recommend to all the general use of one of these compounds in the regular cleaning of floors.

(1) To a pailful of sawdust wet with hot or cold water, add one-half pint of kerosene and a tablespoonful of sulpho-naphthol or formaldehyde. This compound can be prepared some days in advance of its use.

(2) Heat one-third part sand, add two-thirds part sawdust. To a pailful of this compound add one-half pint of paraffin oil and mix thoroughly. This compound produces excellent results.

(3) Boil one pound of salsoda and one pound of chloride of lime in a gallon of water. Dampen sawdust to be used for sweeping with this solution. This compound is excellent with respect to restoring the natural color of floors.

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE BOARD OF HEALTH (UNDER PUBLIC ACT NO. 18 OF 1905), DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

Expenses of members:	
Attending regular meetings	$93 88
Other expenses	97 72
Engraving, drawing, etc.	28 10
Instruments and books	487 24
Paper, stationery, etc.	1,432 39
Postage	1,200 00
Printing and binding	2,747 13
Secretary	2,500 00
Special investigations	224 94
Miscellaneous	188 60
Total	$9,000 00

NOTE.—The appropriation ($9,000.00) at the disposal of the State Board of Health for certain specified purposes. does not include clerk hire. The account of the appropriation ($10,000.00) for clerk hire is kept in the Auditor General's department, and is published in his annual report.

Respectfully submitted,
F. W. SHUMWAY.
Secretary.

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE BOARD OF HEALTH (UNDER SECTION 7 OF ACT 132, LAWS OF 1903), EMBALMERS' FUND, AS ALLOWED DURING THE FISCAL YEAR 1908.

RECEIPTS.		DISBURSEMENTS.	
Fees from applicants for license and for renewals of licenses	$1,424 10	Expenses of members attending meetings	$246 47
		Instruments and books	379 05
		Paper, stationery, etc	91 50
		Postage	125 00
		Printing and binding	145 72
		Drawing, engraving, etc	35 50
		Compensation of extra clerks	261 60
		Miscellaneous	121 69
		Unexpended balance turned over to State Treasurer	17 57
Total receipts	$1,424 10	Total disbursements	$1,424 10

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE BOARD OF HEALTH (UNDER ACT 109, LAWS OF 1907), LABORATORY FUND, AS ALLOWED DURING THE FISCAL YEAR, 1908.

RECEIPTS.		DISBURSEMENTS.	
Appropriation	$5,000 00	Lumber, carpenter work, plumbing and labor installing laboratory	$831 46
		Office furniture and laboratory equipment	2,113 82
		Traveling expenses	128 68
		Postage	34 00
		Printing	68 30
		Bacteriologist's salary	1,391 30
		Clerk's salary	321 74
Overdrawn	04	Miscellaneous	110 74
Total	$5,000 04	Total	$5,000 04

MICHIGAN STATE SANATORIUM FOR THE TREATMENT OF INCIPIENT TUBERCULOSIS.

During the fiscal year 1908, the State Sanatorium at Howell was opened for the reception of patients and the following statement relative to the establishment of the institution, the rules and regulations governing the admission and conduct of patients, work already accomplished, etc., was prepared by Dr. R. L. Kennedy, the Medical Superintendent, for the quarterly bulletin of this Department, April-June, 1908, and is here reprinted for the benefit of those who may not have received a copy of the bulletin:

> The Michigan State Sanatorium was established by a special act of the legislature in 1905, "for the treatment of such persons as shall be proven by proper bacteriological or clinical examination to be suffering from tuberculosis."*
>
> It has been demonstrated beyond all doubt that the best results in the treatment of pulmonary tuberculosis have been obtained in Sanatoria. This is due to the carefully regulated daily routine, the complete and restful change of surroundings, the cheerful companionship, and the constant medical supervision that obtain in institutions devoted to this special purpose, or in other words, the opportunity that is afforded the patient quickly to absorb the principles of correct living and much useful information about tuberculosis, a knowledge of which is so difficult to acquire readily at home and alone, or without a practical demonstration. The State of Michigan in establishing this Sanatorium, offers such an opportunity to those of her citizens who can ill afford the expense incidental to securing such treatment elsewhere.

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* A copy of the Act establishing the State Sanatorium was printed in the annual report of this Board for 1905.

The sum of $30,000 was appropriated by the legislature of 1905 for the purpose of "purchasing site, of erecting, constructing and equipping" the Sanatorium and buildings, and to pay the necessary current expenses for the fiscal years ending June 30, 1906 and 1907. This amount found to be inadequate for construction purposes, an additional appropriation of $62,000 was made by the legislature of 1907 for the purpose of completing the necessary buildings and equipment, and $8,000 a year for maintenance of the Sanatorium for the fiscal years ending June 30, 1908 and 1909. This makes a total of $108,000 appropriated to date,—$88,000 of which will have been spent in erecting and equipping the Sanatorium and improving the property, and $20,000 of which will be used for maintenance for the fiscal years ending June 30, 1907-8-9.

Mr. Frank B. Leland and Dr. Henry J. Hartz of Detroit, Mr. G. W. Teeple of Pinckney, Dr. Collins H. Johnston of Grand Rapids, Dr. Royal S. Copeland of Ann Arbor and Dr. Frank R. Gray of Clare, were appointed by Governor Warner as a Board of Trustees to locate, establish and govern the Sanatorium. After examining numerous locations throughout the State they finally located the institution at Howell, Livingston county, Michigan. It is situated about two and one-half miles southwest of the town of Howell, at one of the highest points of the natural watershed, and is approximately 1,100 feet above sea level.

The land consists of 270 acres, 192 of which were given to the State by the citizens of Howell, the money being raised for the purchase of the same by popular subscription. It is of a rolling, sandy loam, well adapted to the growing of fruits and vegetables, and it is expected eventually to produce almost all of these required for use at the Sanatorium, as well as milk and eggs, thus giving the patients the advantage of a superior quality of fresh food stuffs which is so essential in the treatment of this disease.

An admirable water supply is secured from a series of natural springs on the property, and by pumping this into an elevated reservoir, ample pressure is afforded for all practical purposes as well as protection in the case of fire. A superior quality of ice is also secured from a small lake at the main entrance, fed by these same springs. This lake also furnishes fish for the Sanatorium during the season and affords an opportunity for boating.

A number of groves are scattered about the property affording pleasant and interesting places for the patients on the exercise list. In these many varieties of wild flowers and ferns grow in profusion, and numberless birds, including many beautiful songsters, may also be found, which, owing to the prevailing quiet, are unusually tame and thus permit of close observation.

A magnificent view of the surrounding country within a radius of twenty-five miles can be obtained from the site of the Sanatorium. This expansive view of a varied landscape, continually changing with the progress of the seasons, presents a very restful and pleasing picture to the eye and one that rarely grows monotonous to patients who are compelled to view it from day to day.

The air is singularly dust-free, and even in sultry summer weather, owing to the physical features of the location, a breeze can invariably be found.

The buildings at present consist of an Administration building, and three shacks. The Administration building contains the dining hall, offices, laboratories, kitchen, laundry, staff and help quarters, and eventually will also have two infirmary wings accommodating ten patients each. These infirmary wings, which are a very essential feature, will be provided for patients requiring special care or nursing, and will be so constructed as to give perfect ventilation and allow each patient the privacy of his own bed room, and the opportunity to sleep out-of-doors on a sheltered veranda if advisable. The hard wood finish and rounded corners throughout the Administration building permit of a thorough cleaning as often as necessary. The "Shacks" (a comparatively new term in Sanatorium architecture, and rather misleading to the lay mind) are constructed with the view of securing the maximum amount of fresh air in the twenty-four hours and at the same time afford ample protection from the wind and rain. Each shack is provided with private lockers, a common bath and dressing room and a comfortable living room, where the inmates may congregate for a social hour before bed time. On either side of and opening into the living room, are the partially enclosed verandas or wards where the patients "take the cure" during the day and sleep at night. These shacks accommodate in all thirty-eight patients and additional accommodations will be provided as the institution develops.

The State Sanatorium is in no sense to be considered as a "Consumptives' Home."

It is an institution where patients in the first stages of pulmonary tuberculosis can be sent with a hope of a cure or at least an arrest of the disease that they may become wage-earners again. It is moreover an educational institution where patients are taught the simple but important laws of hygienic living and as such will become a potent factor in the prevention of tuberculosis and consequently of great economic value to the State. Hence only incipient cases, or such as show a probability of cure, will be received.

The treatment, briefly summed up, consists of regulated rest or exercise as indicated by the condition of the patient, an abundance of nourishing food, and the maximum amount of fresh air in twenty-four hours, combined with simple medication for symptoms as they arise. A very important feature of Sanatorium treatment is the constant medical supervision. The following are some rules and suggestions which show in a general way the nature of the treatment and instruction given:

RULES AND SUGGESTIONS.

EXERCISE.

None if feverish.
None if blood in sputum.
None if losing weight.
None if pulse is fast.
None if short of breath.

Regular, systematic and gentle exercise, rain or shine, for not more than one-half hour twice daily is permissible if none of the above symptoms are present. Always bearing in mind:

Never to get out of breath.
Never lift heavy weights.
Never get tired.
Never run.
Go slow about everything.

FOOD.

Three full well-balanced meals daily.

Meat at each meal—beef, mutton and bacon preferred.

Eggs 2-6 and Milk 6-8 glasses, daily if losing weight and the digestion permits.

The digestive powers are usually far greater than the appetite indicates. Food should be taken as a duty even when there is no desire to eat but care must be exercised not to overcrowd the stomach.

No alcohol.

OUTDOOR LIFE.—DAY.

Remain out of doors, rain or shine, winter or summer, from 8 to 10 hours. Accomplish this by gradual exposure. Keep head out of sun on warm days. Avoid draughts and seek the sheltered part of a veranda in stormy weather.

NIGHT.

Remain in bed from 8 to 10 hours. Sleep out-of-doors if possible and, if not, always have windows wide open. Avoid draughts on the head and too many bedclothes.

COUGH AND EXPECTORATION.

Control cough as much as possible. The sputum is the great source of danger and must be destroyed by fire before it dries. Never swallow the sputum under any circumstances and never spit in a pocket handkerchief. Always expectorate in a sputum box and always hold a piece of cheesecloth before the mouth during the act of sneezing and coughing. Use cheesecloth only once and then burn. These precautions are necessary to protect yourself from reinfection, the danger of which is even greater than that of giving the disease to others.

CLOTHING.

Always dress warmly and comfortably. Waistbands and corsets must allow free and easy breathing. Chest protectors should never be worn. Never get overheated. Never get chilly. Use wraps. Fur coats and rugs or blankets are necessary for sitting outdoors in winter.

BATHS.

Warm bath, followed by cold sponge, at least once a week at bedtime and a cold sponge, at least to the waist, every morning.

Always stop any medicine that upsets the stomach.

The bowels must be kept regular.

Do not be alarmed should you have a hemorrhage, simply go to bed and notify your family physician.

A DAILY ROUTINE.

7:30—Awake, a glass of hot water. Cold sponge.
8:00—Breakfast.
8:30—Out of doors, sitting or reclining.
10:30—Lunch—milk and eggs.
11:00—Exercise if permissible.
11:30—Rest until dinner.
1:00—Dinner.
1:30—Out-of-doors, sitting or reclining.
3:30—Lunch—milk and eggs.
4:00—Exercise if permissible.
5:00—Rest outdoors, lying down.
5:30—Supper.
6:00—Out on good nights.
9:00—Lunch and bed.

If appetite is fickle, try taking milk and eggs immediately after meals instead of at lunch time.

All applicants for admission to the Sanatorium must present themselves to one of the examining physicians, who are scattered geographically about the State, and must also furnish a certificate filled out by their family physician. These blank certificates may be obtained by applying to any member of the Examining Board or to the Superintendent of the Sanatorium, and should be filled out carefully and in detail, giving special attention to the physical signs and general symptoms of the applicant. If the applicant is found eligible under the rules, he is so notified and his admission papers are placed on file to wait the first vacancy. Applicants awaiting a vacancy are required to report once a month to the physician who examined them for admission, and should never come to the Sanatorium until definitely notified to do so.

Residents of this State only are eligible for admission. Those who are able to pay are charged seven dollars per week, which covers board, room, medical attendance, nursing and medicine.

Bills are payable monthly in advance.

Those who are unable to pay must furnish a certificate to that effect from the Superintendent of the Poor of their respective county or township, approved by the Judge of Probate of said county. In these cases all the necessary expense for residence at the Sanatorium are defrayed by the State and county as provided by law.

No distinction of any kind is made between paying patients and charity patients. Medical consideration alone decides all questions governing patients while at the Sanatorium.

All patients, who are physically able, are required to care for their own beds and lockers, assist in caring for their own shacks, and do such other work about the Sanatorium and on the property as may be deemed advisable and beneficial to them by the physician in charge. Every patient is expected to cheerfully comply with all the rules and regulations governing the Sanatorium and repeated failure or wilful neglect to do so will render him or her subject to summary discharge.

Six months is the maximum term allowed for the treatment of any patient except for unusual reasons, but a patient's room may be required at any time should the physician in charge deem it for the good of the institution. This does not imply that the greatest amount of benefit is to be derived from the treatment during this limited period of time, but in order to confer the benefit of the treatment upon the largest number of patients there must necessarily be some time limit fixed.

Since the opening of the Sanatorium in September, 1907, there have been 71 applicants, 51 of which have been accepted as patients. Of this number only six were incipient, while 36 were moderately advanced and eight were far advanced. This unfortunate proportion of far advanced cases is due to the fact that it is often impossible to judge the case fairly from its written description, and thus a number of patients were admitted who were obviously beyond the possibility of being cured. These cases were retained for a time to ascertain if some slight improvement might be derived from this treatment and to inculcate the Sanatorium régime upon them so that their future life at home would not endanger their families.

Of the 20 applications rejected the great majority were from patients in the extreme last stage of the disease who should never have applied. There have so far been 17 cases discharged from the institution, the term of residence for each being from one to 256 days, with an average of 95 days. Of the 17 discharged 7 were unimproved, 3 decidedly improved, 7 with disease arrested and 1 apparently cured. Of the 7 unimproved, 6 were admitted as far advanced cases, and the seventh had apparently inherited an extreme susceptibility to the disease from a family which had suffered enormously from tuberculosis. Of the improved and arrested cases a great majority will become cures in time should they continue to care for themselves properly. The statistics of this institution will be much more favorable in the future as the discharges made thus far have been principally from the unfavorable classes where absolute cures are next to impossible.

THE MICHIGAN ASSOCIATION FOR THE PREVENTION AND RELIEF OF TUBERCULOSIS.

The Secretary of this Board was appointed, by the National Association for the Study and Prevention of Tuberculosis, one of a committee to organize a State Antituberculosis Association for Michigan, and this committee met in Detroit, on February 21, 1908, with between two and three hundred representative people from all parts of the State. After listening to a number of addresses, a permanent organization was perfected and a committee, consisting of Doctors C. G. Jennings, V. C. Vaughan, Guy L. Kiefer, George Dock and F. W. Shumway, was elected to select thirty members to act as a Board of Directors of the Association. It was decided to hold the next meeting in Grand Rapids in May or June.

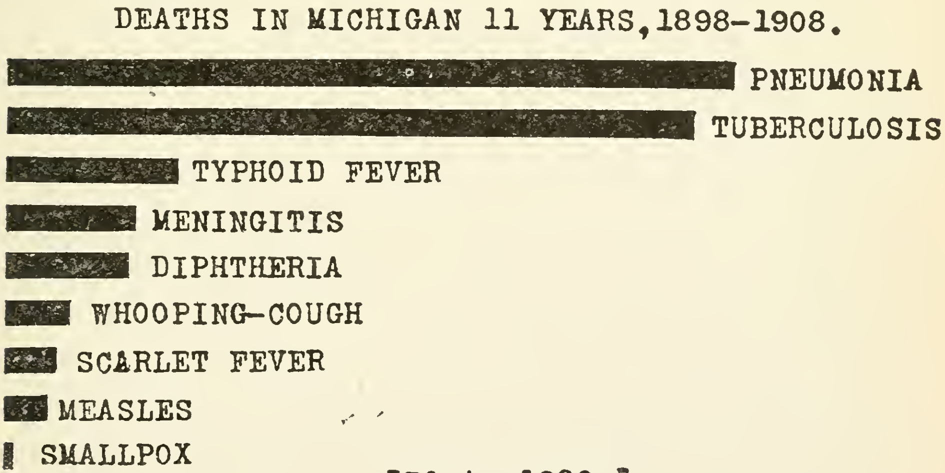
The second meeting of the Association was held in Grand Rapids on June 23. Several interesting papers were delivered, among which were: "A working Plan for the State Association," by Rev. R. E. Macduff, of Jackson; "The Cure of Tuberculosis," by Dr. W. A. Evans, Health Commissioner of Chicago; "The Nature of Tuberculosis," by Dr. A. S. Warthin, of Ann Arbor; and "Charity Day in Detroit," by Miss Clara Dyar. Points discussed and planned for legislation next winter were: Compulsory Registration of Tuberculosis, House Disinfection for Cases of Tuberculosis; and Compensation for Dairymen and Farmers for the Destruction of Tuberculous Cattle. The "Blue Star," used in Detroit on Charity Day, was adopted by the Association as the Michigan emblem.

PART II.

COMMUNICABLE DISEASES IN MICHIGAN DURING THE YEAR ENDING DECEMBER 31, 1907, AND IN PRECEDING YEARS.

INTRODUCTION.

This article is the twenty-seventh in a series upon the same general subject, begun in 1882. It presents a summary of the compilation of the reports received from health officers relative to certain communicable diseases in Michigan during the year 1907, together with a review of some of the information obtained from similar compilations in preceding years. The most dangerous diseases are treated in detail in the order of their importance as causes of deaths, as shown by the diagram below:



[Plate 1289.]

SOME OF THE PURPOSES OF THIS COMPILATION.

In the law establishing the State Board of Health, the Secretary of the Board is required to collect information concerning vital statistics and knowledge respecting diseases, and to disseminate such information among the people. In compliance with this requirement, it is the custom to collect, compile, tabulate and publish information relative to the causes, and methods of prevention and restriction, of the dangerous communicable diseases, under the following general heads: The General Prevalence of each disease; The Geographical Distribution of each disease; The Comparative Prevalence of each disease in Urban and Rural localities; The Reported Sources of Contagium of each disease; and The Restrictive and Preventive Measures in each disease. In the case of pneumonia, an effort is being made to learn the Period of Incubation of the disease. In the case of pneumonia, tuberculosis and meningitis, an effort is being made to show the Influence of Age and Sex, the Duration of Sickness, and the Seasonal Prevalence of each disease.

METHODS OF COMPILATION.

With the exception of pneumonia, tuberculosis, meningitis and typhoid fever, which have been studied by individual cases, the diseases have been compiled by *households,* instead of by *outbreaks* as in the past.

A *household* report is intended to include all the cases which occur in a house, or other place of abode, at or about the same time. When a period of over sixty days has elapsed since the last death or recovery in a household, should the disease reappear in the household and the source of contagium cannot be traced to the previous cases, a separate compilation is made of the subsequent cases. It will be seen, therefore, that it is quite possible for a particular disease to appear in the same household several times during any year and to be counted as one or as several households in the compilation, according to the circumstances attending the outbreaks.

GENERAL PLAN, OF THE REPORTS.

Upon the receipt of information at this office that tuberculosis, diphtheria, typhoid fever, scarlet fever, measles, whooping-cough, meningitis, smallpox, German measles (rötheln), rabies or glanders, was present, or had recently been present, in any locality in the State, a letter was sent to the health officer, or, in his absence to the president of the board of health, mentioning the reported existence of the disease within his jurisdiction, indicating his duties and powers, and the proper measures to be taken in restricting the disease, transmitting documents of instruction relative to the prevention and restriction of the disease for distribution among the neighbors of families in which the disease is present, and asking for reports relative to the methods employed for the restriction of the disease, the results of efforts for suppressing it, and the number of cases and deaths in each outbreak. With this letter, in each instance, except in the case of rabies and glanders, there was sent a sufficient number of blanks for the preliminary and final reports.

The information contained in the several reports, together with other correspondence relative to outbreaks of such diseases, are the bases on which the statements made in this article are founded.

PHYSICIANS' REPORT OF DANGEROUS COMMUNICABLE DISEASES.

By reason of the fact that, in many localities, some physicians do not comply with the law in regard to making reports to the local health officers of cases of dangerous communicable diseases which come under their observation, and for the purpose of securing the better cooperation of physicians in the work of the State and local boards of health, a copy of the following letter was sent to the chairman of each county medical society in the State:

STATE DEPARTMENT OF HEALTH, MICHIGAN.

OFFICE OF THE SECRETARY, LANSING.

July 18, 1907.

.................................., M. D., Chairman of County Medical Society,
....................., Mich.:

Dear Doctor—Recognizing, as we do, the importance of cordial cooperation by the medical profession in our public health work, and finding its lack in many instances a serious hinderance to practical prevention of dangerous communicable diseases, I believe it would be helpful to all concerned if the subject could be brought before your local organization for its consideration, and if some action could be taken relative thereto.

The situation is this: The local boards of health are required through their executive officer, to investigate all cases of dangerous communicable diseases, to see that certain precautions specified in the law are observed, and to report a full history of the same to the State Department of Health. This Department is required to keep a record of each disease, to compile statistics, and to investigate and study how we may most effectually restrict and prevent these diseases. Anticipating the importance of a preliminary notification of these cases, the statute also provides for a prompt report of each case by the attending physician to the local health officer, and I think it must be admitted that this initial push by the physician is indispensable to start rolling the ball of public health service.

We need very much indeed the cordial interest and faithful cooperation of the physicians, and if there is anything your local Society can do to awaken or further this spirit, not only shall we most heartily appreciate it, but shall, I feel confident, be able to render truly fruitful service.

If you see your way clear to take any action, permit me to suggest that a resolution would be helpful to determine the policy and guide the sentiment of the profession in your locality.

I shall be glad to cooperate with you further in this matter, should you see any opportunity for further assistance or suggestion.

Thanking you for your consideration, and for any expression of definite support you may be able to render, I beg to remain

Very truly yours,
(Signed) F. W. SHUMWAY,
Secretary.

PNEUMONIA IN MICHIGAN IN 1907 AND PRECEDING YEARS.

Table 1 indicates that, in 1907, pneumonia was considerably more prevalent than in the preceding year and also more prevalent than the average for the three preceding years. It is believed, and with good reason, that, in each of the four years in which pneumonia has been reported, very many non-fatal cases of the disease were not reported to the local health officers and by them to this Department, and it is known that, as a rule, only the fatal cases were reported from a very large number of localities, particularly in the case of the more densely populated localities where pneumonia is usually the most prevalent. Notwithstanding the efforts put forth by this Department in the past three years for the proper recognition of the dangerous character of this disease, many physicians fail to recognize the necessity for reporting cases under their care to the local health officials. It usually happens that the first information of cases of pneumonia is received by this Department from the deaths returned to the Secretary of State, and by the time this Department has been able to notify the local health officials of the occurrence of the cases, it is too late for them to take the necessary measures for the restriction of the disease.

Pending a more general recognition of the fact of the communicability of pneumonia, local boards of health should require from physicians and householders reports relative to every case of this disease in their jurisdictions, and should take all precautions necessary for the restriction and prevention of the disease.

In this connection, the following letter from this Department to the health officer of a township in the State will be of interest:

[COPY]

Lansing, Michigan, March 14, 1907.

......................, M. D., Health Officer, ..., Michigan:

My Dear Doctor—Referring to your letter of February 21, in which you state that it is your judgment pneumonia shows no contagious character, and that it is a farce to attempt to restrict it as such, I feel that it is worth while to take up the matter with you, if I may engage your attention for a few minutes.

In the first place, strictly speaking, this Department would, perhaps, agree with you that pneumonia is not *contagious* in character; but that the disease is *communicable* there is no question. The organism which it is believed causes the disease, is invariably found in the diseased lung; the statistics relative to pneumonia point unmistakably to its communicable character. If it be granted that tuberculosis is a communicable disease (and it is almost universally recognized as such) the information which we have in regard to tuberculosis and pneumonia is so strikingly parallel, both in regard to the organism causing the disease, and in regard to the mode of spreading the disease, the susceptibility of of certain classes of persons, etc., that the conclusion would inevitably follow that pneumonia is also a communicable disease.

It is true, Doctor, that in individual practice, we do frequently fail to find evidence which will substantitate a theory evolved from both careful investigation by scientists and from statistics based on the aggregate experience of the profession. But a theory is a bird's-eye view; and we know that a bird's-eye view often reveals certain broad relations which are hidden from us when we are observing the mass of detail, bit by bit.

It is also true, that we are as yet much in the dark in regard to pneumonia. But it is the duty of this board to employ recognized facts in regard to these diseases, and to give the public the benefit of any doubt by guarding the public health, awaiting, meanwhile, further light and aid from the results of its own experience as well as from that of others. It entertains no doubt that pneumonia is a communicable disease, and that the great number of deaths now occurring from it can be greatly reduced if restrictive measures be faithfully carried out.

For your cooperation with us, Doctor, I thank you, and wish to remain

Very truly yours,
(Signed) F. W. SHUMWAY,
Secretary.

TABLE 1—*The prevalence of pneumonia in Michigan, in each of the four years, 1904-7.*

Years.	Population.*	Number of cases.†	Number of deaths.	Deaths per 100,000 of the population.
1904	2,530,016	3,790	2,903	114.7
1905	2,557,275	3,227	2,636	103.1
1906	2,584,533	3,387	2,839	109.8
1907	2,611,792	3,976	3,159	121.0
Annual averages	2,570,904	3,595	2,884	112.2

*Estimated for intercensal years.

†From a large number of localities, only the fatal cases were reported, so that the figures in this column do not represent the number of cases which actually occurred.

GEOGRAPHICAL DISTRIBUTION.

In the consideration of this phase of the study of pneumonia, the State is divided into eleven geographical divisions,* the counties in each of which would be likely to have somewhat similar climatic conditions. Judging from the death rates of the several divisions, shown in Table 2, pneumonia was most prevalent in the Southeastern Division and least prevalent in the Southwestern Division. Arranging the divisions in the order of greatest death rates per 100,000 inhabitants, we have the Southeastern (157.6), Upper Peninsula (110.4), Western (108.7), Southern Central (104.8), Central (103.0), Northern Central (102.3), Bay and Eastern (95.5), Northwestern (94.2), Northeastern (90.8), Northern (89.1), Southwestern (81.4). The counties having the highest and lowest death rates were Roscommon (175.4), and Alcona (48.9). Compared with the average death rate for the State as a whole (112.2), the counties in which the disease was unusually prevalent during the four years, 1904-1907, are—Roscommon (175.4), Wayne (169.8), Oscoda (146.6), Delta (134.7), Genesee (134.5), Lapeer (133.9), Alger (132.6), Missaukee (131.8) and Houghton (131.3).

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*The boundaries of the several divisions may be seen by reference to the annual report of this Board for 1886, pages 201 and 217.

TABLE 2—*The geographical distribution of pneumonia, in Michigan, in the four years, 1904-1907, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
Upper Peninsula Division	280,839	405	310	110.4
Alger county	6,785	9	9	132.6
Baraga county	5.398	5	5	92.6
Chippewa county	22,420	29	26	116.0
Delta county	28,217	41	38	134.7
Dickinson county	19,329	18	18	93.1
Gogebic county	17,597	17	16	91.4
Houghton county	72,336	132	95	131.3
Iron county	8,901	12	9	101.1
Keweenaw county	5,045	13	5	99.1
Luce county	4,219	4	4	94.8
Mackinac county	8,451	7	6	71.0
Marquette county	39.549	65	38	96.1
Menominee county	26,247	29	27	102.9
Ontonagon county	7,530	13	6	79.7
Schoolcraft county	8,905	11	8	89.8
Northwestern Division	93,380	128	88	94.2
Benzie county	11,205	14	12	107.1
Grand Traverse county	24,223	28	20	82.6
Leelanau county	10,928	15	12	109.8
Manistee county	26,917	43	26	96.6
Wexford county	20,107	28	18	89.5
Northern Division	88,619	109	79	89.1
Antrim county	15,313	20	17	111.0
Charlevoix county	17,149	20	11	64.1
Cheboygan county	17,909	22	17	94.9
Crawford county	4,196	6	3	71.5
Emmet county	18,628	24	18	96.6
Kalkaska county	7,786	7	6	77.1
Otsego county	7,638	10	7	91.6
Northeastern Division	66,679	75	60	90.8
Alcona county	8.181	7	4	48.9
Alpena county	20,309	21	20	98.5
Iosco county	10,651	8	8	75.1
Montmorency county	3.621	6	4	110.5
Ogemaw county	9.630	15	12	124.6
Oscoda county	2,046	6	3	146.6
Presque Isle county	11,641	12	9	77.3
Western Division	284,143	364	309	108.7
Kent county	141,779	191	171	120.6
Lake county	5,015	4	3	59.8
Mason county	19,879	29	23	115.7
Muskegon county	37,500	54	47	125.3
Newaygo county	18,702	20	12	64.2
Oceana county	18,119	22	20	110.4
Ottawa county	43,149	44	33	76.5
Northern Central Division	109,481	165	112	102.3
Clare county	9,500	15	7	73.7
Gladwin county	9,365	9	8	85.4
Isabella county	24,602	46	25	101.6
Mecosta county	20,037	31	24	119.8
Midland county	14,710	15	13	88.4
Missaukee county	10,626	16	14	131.8
Osceola county	18,931	26	18	95.1
Roscommon county	1,710	7	3	175.4

*†These footnotes are below Table 1, on a preceding page.

TABLE 2.—CONCLUDED.

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rate.
BAY AND EASTERN DIVISION	360,200	413	344	95.5
Arenac county	10,320	10	10	96.9
Bay county	63,859	79	70	109.6
Huron county	35,239	32	28	79.5
Lapeer county	26,878	50	36	133.9
Saginaw county	87,340	89	81	92.7
Sanilac county	34,797	37	30	86.2
St. Clair county	55,788	71	55	98.6
Tuscola county	35,988	45	34	94.5
CENTRAL DIVISION	316,449	629	326	103.0
Barry county	21,842	32	25	114.5
Clinton county	25,235	34	21	83.2
Eaton county	30,346	48	37	121.9
Genesee county	43,109	70	58	134.5
Gratiot county	30,779	40	31	100.7
Ingham county	45,028	58	40	88.8
Ionia county	34,739	48	37	106.5
Livingston county	18,268	23	17	93.0
Montcalm county	33,450	39	34	101.6
Shiawassee county	33,653	44	26	77.3
SOUTHWESTERN DIVISION	143,786	157	117	81.4
Allegan county	38,999	37	29	74.4
Berrien county	49,475	47	35	70.7
Cass county	19,713	25	18	91.3
Van Buren county	35,599	48	35	98.3
SOUTHERN CENTRAL DIVISION	327,285	517	343	104.8
Branch county	25,867	24	20	77.3
Calhoun county	54,331	97	62	114.1
Hillsdale county	29,827	35	26	87.2
Jackson county	46,710	107	55	117.7
Kalamazoo county	51,807	116	67	129.3
Lenawee county	49,356	58	45	91.2
St. Joseph county	22,981	23	21	91.4
Washtenaw county	46,406	57	47	101.3
SOUTHEASTERN DIVISION	513,217	835	809	157.6
Macomb county	33,039	37	30	90.8
Monroe county	32,984	46	41	124.3
Oakland county	46,104	68	57	123.6
Wayne county	401,090	684	681	169.8

*†These footnotes are below Table 1, on a preceding page.

LOCAL PREVALENCE.

Of the 1,645 incorporated localities in Michigan in 1907, 1,024, or about 62 per cent, were, at some time during the year, infected with pneumonia.

To determine what, if any, influence density of population had on the prevalence of pneumonia, the cities and villages have been divided into the five groups shown in Table 3.

It will be seen that the death rate from pneumonia was very much higher in cities of over 50,000 population, and the lowest in cities and villages having populations of from 5,000 to 10,000.

By Table 3A, it may be seen that, in 1907, the urban localities which showed much higher death rates from pneumonia than the death rate for this disease for the entire State for that year were: Detroit, Charlotte, Hancock, Bay City, Flint, Ludington, Muskegon, Kalamazoo, Petoskey, Battle Creek, Alpena, Mt. Clemens, Menominee and Jackson.

The localities, shown in Table 3A, in which the death rates from pneumonia were much lower in 1907 than the rate for the entire State for that year were: Ann Arbor, Adrian, Benton Harbor, Cadillac, Calumet township, Cheboygan, Coldwater, Grand Haven, Holland, Ionia, Ironwood, Lansing, Laurium, Manistee Marquette, Monroe, Mt. Pleasant, Negaunee, Owosso, Traverse City and Ypsilanti.

The localities, shown in Table 3A, which showed much higher death rates from pneumonia in 1907 than the average for such localities in the years 1904-6 were: Alpena, Battle Creek, Bay City, Detroit, Hillsdale, Houghton, Ishpeming, Jackson, Kalamazoo, Ludington, Negaunee, Petosky, Saginaw and St. Joseph.

The localities, shown in Table 3A, which showed much lower death rates from pneumonia in 1907 than the average for such localities in the years 1904-6 were: Adrian, Cadillac, Calumet township, Cheboygan, Escanaba, Holland, Ionia, Ironwood, Laurium, Manistee, Marquette, Monroe, Pontiac and Wyandotte.

TABLE 3—*The prevalence of pneumonia in urban and rural localities, in Michigan, in 1907.*

Localities—Grouped according to density of population.	Population.*	Health jurisdictions.			Cases.†	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50,000	451,507	2	2	100	799	830	183.8
Cities from 25,000 to 50,000	149,577	4	4	100	354	227	151.8
Cities from 10,000 to 25,000, and Calumet Twp. (18,253)	255,174	17	17	100	378	280	109.7
Cities and villages from 5,000 to 10,000	175,993	26	26	100	286	173	98.3
Cities and villages under 5,000‡	361,839	332	205	62	538	405	111.9
Total urban	1,394,090	381	254	67	2,355	1,915	137.4
Balance of localities—principally townships§	1,217,702	1,264	770	61	1,621	1,244	102.2

*† These footnotes are below Table 1, on a preceding page.

‡ Exclusive of forty-two villages, for which the populations in 1907 cannot be correctly estimated.

§ Includes the forty-two villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

TABLE 3A—*The deaths from pneumonia in 1907, and preceding years, in each of the principal localities included in the first four groups in Table 3.*

Localities.	1907.			Average, 1904-1906.		
	Population.*	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Deaths.	Deaths per 100,000 inhabitants.
Adrian	11,450	7	61.1	10,937	11	100.6
Albion	5,261	6	114.0	5,049	7	138.6
Alpena	12,849	20	155.7	12,550	10	79.7
Ann Arbor	14,667	11	75.0	14,619	14	95.8
Battle Creek	24,951	39	156.3	23,126	26	112.4
Bay City	40,562	68	167.6	36,282	†38	104.7
Benton Harbor	6,807	5	73.5	6,737	4	59.4
Cadillac	7,565	4	52.9	7,117	9	126.5
Calumet township	18,253	8	43.8	17,518	23	131.3
Charlotte	5,202	9	173.0	4,885	7	143.3
Cheboygan	6,911	6	86.8	6,790	7	103.1
Coldwater	6,232	4	64.2	6,227	5	80.3
Detroit	349,674	717	205.0	328,114	540	164.6
Escanaba	12,260	16	130.5	11,485	22	191.6
Flint	16,220	27	166.5	15,329	21	137.0
Grand Haven	5,611	5	89.1	5,363	4	74.6
Grand Rapids	101,833	113	111.0	97,756	121	123.8
Hancock	7,527	13	172.7	6,534	14	214.3
Hillsdale	5,303	7	132.0	4,974	2	40.2
Holland	9,848	3	30.5	9,260	6	64.8
Houghton	5,086	5	98.3	4,592	3	65.3
Ionia	5,232	3	57.3	5,225	4	76.6
Iron Mountain	8,092	11	135.9	8,421	9	106.9
Ironwood	10,255	4	39.0	10,098	8	79.2
Ishpeming	10,399	21	201.9	11,215	10	89.2
Jackson	25,390	36	141.8	25,330	28	110.5
Kalamazoo	33,816	54	159.7	31,127	38	122.1
Lansing	23,119	19	82.2	21,224	18	84.8
Laurium	9,161	5	54.6	8,156	8	98.1
Ludington	7,329	12	163.7	7,282	9	123.6
Manistee	11,544	7	60.6	12,320	14	113.6
Marquette	11,120	9	80.9	10,817	13	120.2
Menominee	9,805	14	142.8	10,666	15	140.6
Monroe	6,942	2	28.8	6,399	10	156.3
Mt. Clemens	7,507	11	146.5	7,241	10	138.1
Mt. Pleasant	5,101	3	58.8	4,690	3	64.0
Muskegon	20,956	34	162.2	20,917	31	148.2
Negaunee	6,694	5	74.7	6,763	4	59.1
Norway	5,385	6	111.4	5,038	6	119.1
Owosso	9,482	7	73.8	9,257	6	64.8
Petoskey	5,112	8	156.5	5,161	4	77.5
Pontiac	11,720	12	102.4	11,163	17	152.3
Port Huron	20,681	22	106.4	20,246	22	108.7
Saginaw	49,809	69	138.5	47,676	44	92.3
St. Joseph	5,447	6	110.2	5,364	3	55.9
Sault Ste. Marie	12,120	15	123.8	11,668	15	128.6
Traverse City	12,610	9	71.4	11,695	9	77.0
Wyandotte	5,607	6	107.0	5,486	14	255.2
Ypsilanti	7,744	7	90.4	7,639	6	78.5

*Estimated for intercensal years.

†Does not include West Bay City for 1904, which was consolidated with Bay City in 1905.

SEASONAL PREVALENCE.

Judging from the average number of persons who were taken sick in each month in the four years, 1904-1907, shown in Table 4, pneumonia was most prevalent in the month of February, and least prevalent in the month of August.

By the Secretary of State's Vital Statistics of Michigan, it appears that during the ten years, 1898-1907, the greatest number of deaths from pneumonia occurred in the months of February and March, and the smallest number in August.

The months of greatest prevalence of pneumonia are from December to May, both inclusive.

TABLE 4—*The seasonal prevalence of pneumonia, in Michigan, as indicated by the average number of persons taken sick in each month in the four years, 1904-1907, and by the average number of deaths, from this disease, in each month in the ten years, 1898-1907.*

Years.		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1904-1907	Average number of persons taken sick in each month*	484	520	414	340	293	118	72	56	83	137	227	311
1898-1907	Average number of deaths in each month†........	351	399	385	313	242	121	71	61	76	116	176	254

*The month in which some of the cases began was not reported.

†The averages for the years 1898-1903 are compiled from the Secretary of State's Vital Statistics of Michigan, and for the four years, 1904-1907, from the Michigan Monthly Bulletin of Vital Statistics.

INFLUENCE OF AGE AND SEX.

The ages of those taken sick with pneumonia in the four years, 1904-1907, were stated in 13,983 instances.

In the case of those who died from pneumonia, the ages were stated in 11,359 instances, and of this number, 24 per cent were under one year; 37 per cent under 5 years; nearly 10 per cent between the ages of five and twenty-four years; 16 per cent between the ages of twenty-five and forty-nine years; 25 per cent between the ages of fifty and seventy-four years; and nearly 12 per cent 75 years and over.

The number and per cent of cases and deaths, by one year periods from 0 to 5 years, and by five year periods from 5 to 75 years, are contained in Table 5.

The average age of non-fatal cases was for males 25.5 years, and for females 28.3 years.

The average age of fatal cases was for males 31.5 years, and for females 34.2 years.

Thirty-eight per cent of the males and 36 per cent of the females who died, and 17 per cent of the males and 19 per cent of the females who recovered, were under five years of age.

Ten per cent of the males and 14 per cent of the females who died, and 2 per cent of the males and 4 per cent of the females who recovered, were over 74 years of age.

Up to the third year, and between the ages of 15 and 64 years, inclusive, the fatality was slightly higher in the males than in the females. At nearly all ages, the recoveries were more numerous among males than females.

TABLE 5.—*The influence of age ana sex in pneumonia, as indicated by the numbers of those of known ages, who died or recovered from this disease in the four years, 1904-1907, arranged, by sex, in age periods of one year for those of from one to five years; in five year periods for those of from five to seventy-five years; and in one group for those of seventy-five years and over.*

Age periods.	Died.									Recovered.					
	Total deaths.			Per cent of deaths.			Average deaths per year.			Total recoveries.			Average recoveries per year.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes	Males.	Females.	Both sexes.
0-1 years	1,584	1,143	2,727	13.94	10.06	24.00	396	286	682	59	41	100	15	10	25
1-2 years......	491	414	905	4.32	3.64	7.96	123	104	227	48	48	96	12	12	24
2-3 years.......	159	149	308	1.40	1.31	2.71	40	37	77	45	48	93	11	12	23
3-4 years.......	86	95	181	.76	.84	1.60	22	24	46	58	46	104	15	12	27
4-5 years.......	58	63	121	.51	.56	1.07	15	16	31	41	27	68	10	7	17
Under 5 years...	2,378	1,864	4,242	20.93	16.41	37.34	595	466	1,061	251	210	461	63	53	116
5-9 years.......	141	148	289	1.24	1.30	2.54	35	37	72	190	154	344	48	39	87
10-14 years.....	75	87	162	.66	.77	1.43	19	22	41	126	101	227	32	25	57
15-19 years.....	169	119	288	1.49	1.05	2.54	42	30	72	171	69	240	43	17	60
20-24 years.....	177	132	309	1.56	1.16	2.72	44	33	77	121	53	174	30	13	43
25-29 years.....	168	138	306	1.48	1.21	2.69	42	35	77	82	53	135	21	13	34
30-34 years.....	217	143	360	1.91	1.26	3.17	54	36	90	75	57	132	19	12	31
35-39 years.....	211	155	366	1.86	1.36	3.22	53	39	92	81	53	134	20	13	33
40-44 years.....	272	138	410	2.39	1.22	3.61	68	35	103	78	55	133	20	14	34
45-49 years.....	261	154	415	2.30	1.36	3.66	65	39	104	66	68	134	17	17	34
50-54 years.....	261	154	415	2.30	1.36	3.66	65	39	104	68	49	117	17	12	29
55-59 years.....	292	215	507	2.57	1.89	4.46	73	54	127	45	38	83	11	10	21
60-64 years.....	323	280	603	2.84	2.47	5.31	81	70	151	40	50	90	10	13	23
65-69 years.....	326	334	660	2.87	2.94	5.81	82	84	166	32	48	80	8	12	20
70-74 years.....	347	351	698	3.05	3.09	6.14	87	88	175	38	37	75	10	9	19
75 years and over	605	724	1,329	5.33	6.37	11.70	151	181	332	26	39	65	7	10	17
All ages......	6,223	5,136	11,359	54.88	45.12	100.00	1,556	1,284	2,840	1,490	1,134	2,624	373	284	657

DURATION OF FATAL AND NON-FATAL CASES.

The average duration of fatal cases was for males 8.4 days, and for females 8.5 days.

The average duration of non-fatal cases was for males 18.4 days, and for females 18.6 days.

Of the fatal cases, the greatest number of deaths, both male and female, occurred between the first and eleventh days; the next greatest number, before the sixteenth day, and the next, before the twenty-first day.

Of the non-fatal cases, the greatest number of recoveries, both male and female, took place between the tenth and twenty-first days.

The per cent of deaths and recoveries, both male and female, in five day periods, is shown in Table 6.

TABLE 6.—*The duration of sickness in fatal and non-fatal cases of pneumonia, of known duration, during the four years, 1904-1907, arranged by sex, in five day periods.*

Duration periods.	Fatal cases.						Non-fatal cases.					
	Number.			Per cent.			Number.			Per cent.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
1 to 5 days	2,121	1,683	3,804	22.67	17.99	40.66	25	20	45	1.09	.87	1.96
6 to 10 days	1,772	1,542	3,314	18.94	16.48	35.42	200	139	339	8.71	6.05	14.76
11 to 15 days	613	487	1,100	6.55	5.21	11.76	317	242	559	13.80	10.54	24.34
16 to 20 days	222	189	411	2.37	2.02	4.39	282	209	491	12.28	9.10	21.38
21 to 25 days	123	134	257	1.31	1.44	2.75	192	159	351	8.36	6.92	15.28
26 to 30 days	85	61	146	.92	.64	1.56	107	90	197	4.66	3.92	8.58
31 days and over	179	145	324	1.91	1.55	3.46	182	133	315	7.92	5.78	13.70
Totals	5,115	4,241	9,356	54.67	45.33	100.00	1,305	992	2,297	56.82	43.18	100.00

TABLE 7—*Predisposing influences in pneumonia, as indicated by the manner in which the disease was reported to have begun in some of the cases in the years 1904-1907.*

Disease began as or followed.	Number of instances.	Disease began as or followed.	Number of instances.
Cold	2,684	Anemia	5
Influenza	648	Malarial fever	5
Bronchitis	400	Teething	5
Exposure to inclement weather	332	Erysipelas	5
Measles	183	Insanitary conditions	5
Whooping-cough	141	Miscarriage	5
Heart disease	126	Dropsy	5
Senility	95	Diabetes	5
Pleurisy	61	Neutral insufficiency	4
Asthma	57	Cholera infantum	4
General debility	51	Syphilis	4
Alcoholism	44	Epilepsy	4
Kidney trouble	42	Non-acclimated	4
Meningitis	41	Spinal trouble	4
Confinement	37	Operation	3
Rheumatism	32	Appendicitis	3
Traumatism	28	Softening of brain	3
Bowel trouble	23	Morphine habit	3
Stomach trouble	20	Otitis media	3
Tuberculosis	19	Jaundice	2
Tonsillitis	19	Uremia	2
Paralysis	18	Cancer	2
Nephritis	15	Dust on lungs	2
Malnutrition	14	Catarrhal fever	2
Convulsions	12	Mumps	2
Gastro enteritis	12	Scarlet fever	2
Abscess	11	Premature birth	2
Liver trouble	11	Adenoids	1
Typhoid fever	10	Atmospheric conditions	1
Croup	10	Eczema	1
Diphtheria	9	Chicken-pox	1
Throat trouble	8	Indigestion	1
Lung trouble	7	Anaesthesia	1
Peritonitis	7	Change of life	1
Marasmus	7	Strangulation of hernia	1
Sepsis	6	Eye trouble	1
Apoplexy	6	Smoking	1
Sporadic	5	Eclampsia	1
Hemorrhage of lungs	5	Congestion of brain	1

PREDISPOSING INFLUENCES.

In reply to the question, "What sickness or other predisposing influence preceded this case?" 2,684 cases were reported as having followed a cold; 648 cases following influenza; 400 cases following bronchitis, and 332 cases following exposure to inclement weather.

These, and other predisposing influences, are shown in Table 7, on a preceding page and this table may well be studied in connection with Table 8.

REPORTED SOURCE OF CONTAGIUM.

By reason of the difficulty met with in tracing cases of pneumonia to their source, the information contained in the reports of health officers relative to the sources of contagium in this disease is very meagre.

Of the 169 cases in which a source was given, 157 were reported as having been contracted while nursing, or otherwise coming in contact with, pneumonia patients.

Other reported sources of contagium are shown in Table 8, and this table may well be studied in connection with Table 7, on a preceding page.

TABLE 8—*Reported sources of contagium in pneumonia, in Michigan, in the four years, 1904--1907.*

Sources.	Number of instances.
Traced to a former case in same jurisdiction	157
From outside jurisdictions	8
Foreign bodies in bronchial tubes	3
Handling mail	1
Not stated, or statements doubtful	14,211

PERIOD OF INCUBATION.

By reason of the difficulty experienced in locating individual sources of contagium and, by this means, the time of exposure to pneumonia, the period of incubation is not easy to determine. As indicating the probable average period of incubation in the four years, 1904-1907, it may be stated that, in the majority of instances, the time which elapsed between certain cases and recent previous cases in the same households was from one to eight days, the maximum number of cases having occurred on the seventh day.

The period of time which elapsed between the occurrence of three hundred and twelve cases of pneumonia and previous cases in the same households, in the years 1904-1907, is shown in Table 9. The table may also be of service in studying the questions of *communicability* in pneumonia and the *susceptibility,* to future attacks, of persons who have once had the disease.

TABLE 9—*The communicability of pneumonia, as probably indicated by the number of contemporary cases in the same households; the period of incubation in pneumonia, as probably indicated by the time which elapsed between the occurrence of certain cases of this disease and recent previous cases in the same household; and the susceptibility of certain persons to pneumonia, as probably indicated by the number of instances in which second, and even third, attacks occurred in the same persons, in Michigan, in the four years, 1904-1907.*

Time of occurrence of subsequent cases in the same household.	Number of instances.	Time of occurrence of subsequent cases in the same household.	Number of instances.
About same time	41	Twenty-four days	1
Twelve hours	1	Twenty-six days	1
One day	9	Twenty-seven days	2
Two days	11	One month	12
Three days	11	One month and fifteen days	3
Four days	12	Two months	6
Five days	10	Three months	*7
Six days	9	Four months	5
Seven days	16	Five months	1
Eight days	7	Seven months	2
Nine days	2	Eight months	1
Ten days	5	Nine months	*1
Eleven days	3	Ten months	1
Twelve days	1	Eleven months	1
Thirteen days	5	One year	†29
Fourteen days	1	One year and seven months	*3
Fifteen days	2	Two years	‡13
Sixteen days	2	Three years	8
Nineteen days	2	Three years and six months	1
Twenty-one days	3	Four years	*3
Twenty-two days	1	Five years	§7
Twenty-three days	1	Time not stated	49

*In one instance a second attack in the same person.

†In four instances a second attack in the same person.

‡In three instances a second attack in the same person.

§In one instance a second attack, and in another instance a third attack in the same person in the five years.

INFLUENCE OF OCCUPATION.

The occupations of pneumonia patients in the four years, 1904-1907, were given in 6,287 instances, and of this number, at least 4,263 were engaged in occupations which, it is believed, exposed them, or rendered them susceptible, to this disease.

Heading the list are those engaged in housework—housewives, housekeepers and domestics—to the number of 2,311, many of whom spend a considerable portion of their time in ill ventilated and dust laden rooms. Dirt—often contaminated with infected sputum—carried into the home on the shoes and skirts, and disseminated throughout the rooms by air currents, or by the periodical sweeping and dusting, is generally believed to play a very important part in the spread of pneumonia, and other diseases of the respiratory organs.

Next in order are the farming class, to the number of 1,364, who, though naturally a hardy race, and living under atmospheric conditions which tend to health and vigor, seem to be very susceptible to this disease.*

Next in order are the laboring class, with 790 cases; and next to them the student class—principally young children of school age—with 393 cases.

In the three years, 1905-7, there were 3,437 cases where the ages of the patients were given as under 5 years, therefore no occupation was given, and they were still too young to attend school, so could not be included in the student class.

A complete list of the occupations of pnuemonia patients, as reported in the four years, 1904-1907, may be found in Table 10.

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*The following extract from a local paper in this State may throw some light upon this apparent anomaly:

HEALTH OF THE FARMER.

It is perfectly apparent to any one who is at all familiar with country life that many of the women who are called upon to preside over the farmhouse are properly equipped for the work that is set before them, says the Baltimore Sun. The outdoor life of the farmer should be the most healthful of lives, and yet it is, we believe, a fact that they are not longer lived nor more healthy than those engaged in sedentary occupations.

There are various reasons for this. One is the farmer's own lack of care in looking after the sanitary condition of the surroundings. The air he breathes may be polluted by a pigpen near his back door; the water he drinks may be polluted by drainage from his backyard or by things which fall into his well. This is not the fault of the woman.

The average farmer is also notoriously careless about keeping dry. He is in and out in all weathers and is prone to sit with wet clothes or wet feet The woman's contribution to ill health, when there is any, comes in the form of ill cooked and unwholesome food.

TABLE 10.—*The influence of occupation in pneumonia, in the four years, 1904–1907.*

Occupation.	Number of instances.	Occupation.	Number of instances.	Occupation.	Number of instances.
Housewife	2,311	Barber	12	Inspector	3
Farmer	1,364	Nightwatch	11	Lineman	3
Laborer	790	Cigarmaker	11	Attendant in prison or asylum	2
Student	393	Hotel keeper	11		
Mechanic	257	Tinner	10	Cattle buyer	2
Merchant	146	Woodworker	9	Soldier	2
Miner	98	Legal profession	9	Surface foreman	2
Office clerk	74	Printer	9	Messenger	2
Teamster	72	Janitor	9	Laundryman	2
Railroad man	64	Liveryman	9	Theatrical man	2
Store clerk	58	Harnessmaker	9	Hair dresser	2
Painter and paperhanger	44	Tailor	9	Butter maker	1
Woodsman	38	Policeman	8	Bean picker	1
Agent	37	Musician	7	Stone cutter	1
School teacher	35	Fisherman	6	Well digger	1
Minister	28	Waiter	6	Bookbinder	1
Factory employe	28	Mail carrier	6	Architect	1
Bartender	22	Real estate man	6	Carpet weaver	1
Gardener or florist	21	Washerwoman	5	Elevator boy	1
Contractor	20	Plumber	5	Plasterer	1
Physician	20	Milliner	4	Upholsterer	1
Lumberman	19	Hotel porter	4	Trapper	1
Sailor	19	Dentist	4	Ice cream maker	1
Cook	17	Baker	4	Race horse man	1
Shoemaker	17	Nun	4	Ice man	1
Dressmaker and seamstress	17	Street car conductor	3	Chemist	1
Miller	15	Marine engineer	3		
Nurse	15	Engineer and surveyor	3	Not stated, or statements doubtful	8,093
Butcher	12	Veterinarian	3		

RESTRICTIVE AND PREVENTIVE MEASURES.

By reference to Table 11, it will be seen that, of the total number of cases of pneumonia in the four years, 1904-1907, but 3,890, or 27 per cent, were isolated from all persons except nurses and attending physicians; that in 5,382 instances, or 39 per cent of the whole number, the sputa was disinfected; and that in 6,781 instances, or 47 per cent of the whole number, the rooms occupied by pneumonia patients were disinfected.

As previously stated, in a large number of instances, this Department received its first information of cases of pneumonia through the death returns and, in many instances, the health officials had no knowledge of these cases until notified of the same by this Department. It was then too late to carry out the usual restrictive and preventive measures, and this fact will account, to a considerable extent, for the comparatively small number of cases in which precautions were taken.

In the consideration of measures for the prevention of pneumonia, it is suggested that a vast amount of good may be accomplished along this line by the Press, particularly at the time when pneumonia is usually most prevalent, in the publication of articles relative to the conditions which predispose to this disease, as colds; a weakened condition of the body due to dissipation or insufficient nutrition; lack of proper clothing; living in close, ill-ventilated quarters, etc.

TABLE 11—*Restrictive and preventive measures in pneumonia, in Michigan, in the four years, 1904-1907.*

Restrictive and preventive measures.	Number of cases.	Per cent.
ISOLATION:		
Enforced	3,890	27
Neglected	3,812	27
Not stated, or statements doubtful	6,678	46
DISINFECTION OF SPUTA:		
Enforced	5,382	*39
Neglected	1,545	*11
Not stated, or statements doubtful	7,032	*50
DISINFECTION OF BEDDING, CLOTHING, ETC., SOILED BY SPUTA:		
Enforced	7,159	*51
Neglected	1,650	*12
Not stated, or statements doubtful	5,150	*37
DISINFECTION OF ROOM OCCUPIED BY PATIENT:		
Enforced	6,781	47
Neglected	2,737	19
Not stated, or statements doubtful	4,862	34

*In 421 instances the reports stated that there was no sputa, therefore this number has been deducted from the total number of cases before making the per cent.

TUBERCULOSIS IN MICHIGAN IN 1907 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1907, tuberculosis was reported present at 827 incorporated health jurisdictions in this State, with an aggregate of 2,699 cases, including 2,496 deaths.

The word "cases," as used in this article, includes only the cases of which this Department received the first report, during any one year, and is not intended to include the actual number of cases which began or were present in any year.

There were still sick at the close of the year approximately 400 persons, of whose sickness information had been received by this Department from time to time during the year. There were also a number of persons still sick at various times during the year, but of whom the Department received no information at the close of the year. Some of them may have recovered prior to December 31.

By reason of the fact that many cases of this disease are of long duration, and in some stages of the disease not under the care of a physician, the number of reports received by this Department are believed to be considerably less than the actual number of cases which occurred.

From many localities, only the deaths from tuberculosis are reported, therefore the apparent rates of deaths to cases are much too high.

In this article, the deaths reported to the Secretary of State are used in the several tables in conjunction with those reported to this Department.

The compilation of information relative to the prevalence of tuberculosis in Michigan was made for the first time in 1893, but from that time to 1898, when the new law for the registration of deaths took effect, the reports were much less than the actual number of cases and deaths which occurred. Hence the reason for commencing Table 12 with the year 1898.

The number of deaths from pulmonary tuberculosis per 100,000 persons living, reported to the Secretary of State during the twenty-nine years, ending with 1897 (Table 13), probably quite accurately represents the annual fluctuations of, but not the total deaths from, this disease. It may be seen that, compared with any previous year, there was a remarkable and unprecedented decrease in the death rate from this disease in 1891, and the decrease occurred at a time when influenza was epidemic in the country. Statistics for the Eastern States at that time showed an increase in the death rates from tuberculosis, which increase was attributed to the influence of the epidemic influenza.

The decrease in tuberculosis in Michigan has apparently resulted from the education of the people to a knowledge that tuberculosis is a dangerous communicable disease, which may easily be restricted. It is one more forcible illustration of the fact that "Knowledge is Power." Knowledge of the modes whereby tuberculosis is usually spread, and of the ease with which its spread may be lessened, by the destruction or disinfection of all infected sputa, has apparently supplied a "power" which has caused an unprecedented reduction in the death rate from tuberculosis. The extent of the "campaign of education" which, in Michigan, began in 1880, and which took on an especially vigorous activity in 1891, can hardly be realized without a study of its history; but the apparent results of that educational movement are exceedingly plain to be seen from Table 13.

Some of the reasons for believing that the decrease in the death rate from tuberculosis has been due to the popular education in the way the disease is usually spread, and in the way to restrict the disease are: 1. The disease was under observation for many years before that knowledge became general, and (as shown by Table 13) it did not decrease; the decrease has been nearly coincident with the education, lagging behind somewhat at the outset, and gradually increasing later, as it would be expected to do if caused by the popular education. 2. Precisely similar decrease occurred in Michigan in the death rate from scarlet fever and from other diseases, coincident with systematic popular education in the ways those diseases are usually spread, and in the best measures for their restriction. 3. The decrease in the mortality from tuberculosis has, apparently been greatest in those States where systematic popular education for its restriction has been most general and active. 4. There is no other known cause capable of producing such a gradually increasing effect as is shown to have occurred.

TABLE 12—*The prevalence of tuberculosis, in Michigan, in each of the ten years, 1898–1907.*

Years.	Population.*	Number of cases.†	Number of deaths.	Deaths per 100,000 population.
1898	2,389,393	3,041	2,728	114.2
1899	2,426,331	2,975	2,516	103.7
1900	2,420,982	2,721	2,221	91.7
1901	2,448,241	2,915	2,344	95.7
1902	2,475,499	2,658	2,185	88.3
1903	2,502,758	2,745	2,319	92.7
1904	2,530,016	2,928	2,515	99.4
1905	2,557,275	2,590	2,464	96.4
1906	2,584,533	2,653	2,502	96.8
1907	2,611,792	2,699	2,496	95.6
Average per year	2,494,682	2,793	2,429	97.4

* Estimated for intercensal years.

† From Detroit, and many other localities, only the fatal cases were reported, so that the figures in this column do not represent the number of cases which actually occurred.

TABLE 13—*The number of reported deaths from tuberculosis of the lungs per 100,000 persons living, in Michigan, in each of the twenty-nine years, 1869–1897. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Year.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
Deaths	108.1	122.5	106.0	115.1	109.6	102.0	104.9	109.2	110.9	106.1	105.6	111.7
Year.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.
Deaths	116.1	104.4	112.3	120.8	105.3	107.3	108.7	121.0	104.3	105.4	96.3	95.2
Year.	1893.	1894.	1895.	1896.	1897.	Average, 1869–1897.						
Deaths	97.7	98.4	105.1	90.4	80.6	106.2						

GEOGRAPHICAL DISTRIBUTION.

By Table 14 it may be seen that, as indicated by the average death rates for the entire State (shown in Table 12), the disease was much more prevalent than the average in the counties of Mackinac, Grand Traverse, Wayne and Roscommon.

In a lesser degree, the disease was more prevalent that the average in the counties of Luce, Houghton, Delta, Benzie, Macomb, Leelanau, Marquette, Kent, Kalamazoo, St. Joseph, Muskegon, Shiawassee and Washtenaw.

The exceptionally high death rates from tuberculosis in the counties of Mackinac, Grand Traverse, Roscommon and Wayne are due, in the main, to the following exceptional conditions.

In Mackinac county, to the deaths from tuberculosis in St. Ignace city, many of whom were Indians or part Indian, the annual rate for this city being about 250 deaths per 100,000 inhabitants; in Grand Traverse county, to the comparatively large number of deaths from tuberculosis which occur each year in the Northern Michigan Asylum, Traverse City, in which institution the treatment of tuberculous persons is made a specialty; in Roscommon county, to the fact that this county is the most sparsely settled of any in the State, the population being about 1,700, so that even two deaths in each year in the entire county will bring the death rate up to 118 per 100,000 inhabitants; and in Wayne county, to the large number of deaths in the city of Detroit, and in the Wayne County Home, Nankin township, at which institution a specialty is made of caring for tuberculous persons.

TABLE 14—*The geographical distribution of tuberculosis, in Michigan, in the ten years, 1898–1907, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	266,569	326	267	100.2
Alger county	6,192	4	3	48.4
Baraga county	5,120	5	5	97.7
Chippewa county	21,429	23	21	98.0
Delta county	26,049	36	30	115.2
Dickinson county	18,152	17	16	88.1
Gogebic county	16,805	14	13	77.4
Houghton county	66,856	103	77	115.2
Iron county	8,759	8	6	68.5
Keweenaw county	4,015	5	4	99.6
Luce county	3,461	4	4	115.6
Mackinac county	7,857	12	11	140.0
Marquette county	40,167	57	45	112.0
Menominee county	26,249	21	20	76.2
Ontonagon county	6,909	10	6	86.8
Schoolcraft county	8,549	7	6	70.2
NORTHWESTERN DIVISION.	90,387	118	95	105.1
Benzie county	10,770	13	12	111.4
Grand Traverse county	22,728	42	30	132.0
Leelanau county	10,867	13	12	110.4
Manistee county	27,453	32	27	98.3
Wexford county	18,569	18	14	75.4
NORTHERN DIVISION.	81,887	80	69	84.3
Antrim county	15,554	15	13	83.6
Charlevoix county	15,305	17	14	91.5
Cheboygan county	16,842	15	14	83.1
Crawford county	3,472	3	2	57.6
Emmet county	16,678	19	16	95.9
Kalkaska county	7,275	7	6	82.5
Otsego county	6,761	4	4	59.2
NORTHEASTERN DIVISION.	59,073	46	42	71.1
Alcona county	5,633	6	5	88.8
Alpena county	19,673	14	14	71.2
Iosco county	10,222	9	8	78.3
Montmorency county	3,486	3	3	86.1
Ogemaw county	8,301	7	6	72.3
Oscoda county	1,808	2	1	55.3
Presque Isle county	9,950	5	5	50.3
WESTERN DIVISION.	276,457	330	276	99.8
Kent county	137,004	185	149	108.8
Lake county	5,038	5	5	99.2
Mason county	19,757	22	19	96.2
Muskegon county	36,725	44	37	100.7
Newaygo county	18,183	14	13	71.5
Oceana county	17,589	15	14	79.6
Ottawa county	42,161	45	39	92.5
NORTHERN CENTRAL DIVISION.	106,429	96	82	77.0
Clare county	8,958	7	6	67.0
Gladwin county	7,813	6	5	64.0
Isabella county	24,038	24	20	83.2
Mecosta county	20,598	21	18	87.3
Midland county	14,909	13	12	80.5
Missaukee county	9,937	6	5	50.3
Osceola county	18,539	17	14	75.5
Roscommon county	1,637	2	2	122.2

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* † These footnotes are below Table 12.

TABLE 14.—Concluded.

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
BAY AND EASTERN DIVISION.	347,237	317	289	83.2
Arenac county	9,783	5	5	51.1
Bay county	64,013	64	60	93.7
Huron county	35,164	30	27	76.8
Lapeer county	27,400	24	21	76.6
Saginaw county	84,366	77	72	85.3
Sanilac county	35,007	35	31	88.6
St. Clair county	55,431	48	42	75.8
Tuscola county	36,073	34	31	85.9
CENTRAL DIVISION.	316,391	334	282	89.1
Barry county	22,390	22	17	75.9
Clinton county	25,356	24	21	82.8
Eaton county	31,303	36	30	95.8
Genesee county	42,471	48	39	91.8
Gratiot county	30,144	31	28	92.9
Ingham county	42,900	39	32	74.6
Ionia county	35,090	41	35	99.7
Livingston county	19,013	21	17	89.4
Montcalm county	33,731	32	29	86.0
Shiawassee county	33,983	40	34	100.1
SOUTHWESTERN DIVISION.	143,154	155	134	93.6
Allegan county	39,034	42	35	89.7
Berrien county	49,595	54	49	98.8
Cass county	20,394	23	19	93.2
Van Buren county	34,131	36	31	90.8
SOUTHERN CENTRAL DIVISION.	323,415	388	316	97.7
Branch county	26,369	29	24	91.0
Calhoun county	52,394	55	51	97.3
Hillsdale county	29,840	33	28	93.8
Jackson county	47,453	48	44	92.7
Kalamazoo county	48,302	80	53	109.7
Lenawee county	48,938	47	43	87.9
St. Joseph county	23,606	29	24	101.7
Washtenaw county	46,513	67	49	105.3
SOUTHEASTERN DIVISION.	483,707	604	576	119.1
Macomb county	33,098	41	36	108.8
Monroe county	33,146	38	33	99.6
Oakland county	45,359	53	43	94.8
Wayne county	372,104	472	464	124.7

* † These footnotes are below Table 12.

THE PREVALENCE OF TUBERCULOSIS IN URBAN AND RURAL LOCALITIES.

By reference to Table 15, it may be seen that, in 1907, as indicated by the death rates, tuberculosis was most prevalent in the large centers of population, particularly in the cities of 50,000 inhabitants and over, and in localities of from 10,000 to 25,000 inhabitants. It may also be seen that the death rates were higher in all the groups of urban localities than the death rate for the entire State for that year, shown in Table 12.

By Table 15A, it may be seen that, in 1907, the urban localities which showed much higher death rates from tuberculosis than the death rate for this disease for the entire State for that year were: Ann Arbor, Benton Harbor, Detroit, Escanaba, Hancock, Ionia, Ishpeming, Jackson, Kalamazoo, Manistee, Marquette, Monroe, Mt. Clemens, Muskegon, Negaunee, Owosso, Pontiac, Sault Ste. Marie, Traverse City and Wyandotte.

The localities, shown in Table 15A, in which the death rates from tuberculosis were much lower in 1907 than the rate for the entire State for that year were: Alpena, Cadillac, Calumet township, Charlotte, Iron Mountain, Lansing, Ludington, and Mt. Pleasant.

The localities, shown in Table 15A, which showed much higher death rates from tuberculosis in 1907 than the average for such localities in the years 1904-6, were: Adrian, Coldwater, Ionia, Ironwood, Ishpeming, Laurium, Manistee, Monroe, Norway, Owosso and Sault Ste. Marie.

The localities, shown in Table 15A, which showed much lower death rates from tuberculosis in 1907 that the average for such localities in the years 1904-6 were: Alpena, Battle Creek, Bay City, Cadillac, Calumet township, Charlotte, Holland, Houghton, Iron Mountain, Ludington, Mt. Pleasant and Petoskey.

TABLE 15—*The prevalence of tuberculosis in urban and rural localities, in Michigan, in 1907.*

Localities—grouped according to density of population.	Population.*	Health jurisdictions.			Cases.†	Deaths.	Death rates per 100,000 of the population.
			Infected.				
		Total.	Number.	Per cent of all jurisdiction.			
Cities over 50,000	451,507	2	2	100	616	553	122.5
Cities from 25,000 to 50,000	149,577	4	4	100	170	155	103.6
Cities from 10,000 to 25,000 and Calumet township (18,253)	255,174	17	17	100	346	305	119.5
Cities and villages from 5,000 to 10,000	175,993	26	26	100	200	173	98.3
Cities and villages under 5,000‡	361,839	332	179	54	378	372	102.8
Total urban	1,394,090	381	228	60	1,710	1,558	111.8
Balance of localities—principally townships§	1,217,702	1,264	599	48	989	938	77.0

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* † These footnotes are below Table 12, on a preceding page.

‡ Exclusive of forty-two villages, for which the populations in 1907 cannot be correctly estimated.

§ Includes the forty-two villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities which have corresponding populations.

TABLE 15 A—*The deaths from tuberculosis in 1907, and in preceding years, in each of the principal localities included in the first four groups in Table 15.*

Localities.	1907.			Average, 1904–1906.		
	Population.*	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Deaths.	Deaths per 100,000 inhabitants.
Adrian	11,450	10	87.3	10,937	5	45.7
Albion	5,261	4	76.0	5,049	4	79.2
Alpena	12,849	4	31.1	12,550	9	71.7
Ann Arbor	14,667	24	163.6	14,619	19	130.0
Battle Creek	24,951	23	92.2	23,126	29	125.4
Bay City	40,562	32	78.9	36,282	†39	107.5
Benton Harbor	6,807	10	146.9	6,737	9	133.6
Cadillac	7,565	3	39.7	7,117	7	98.4
Calumet township	18,253	13	71.2	17,518	24	137.0
Charlotte	5,202	3	57.7	4,885	5	102.4
Cheboygan	6,911	5	72.3	6,790	6	88.4
Coldwater	6,232	6	96.3	6,227	4	64.2
Detroit	349,674	439	125.5	328,114	407	124.0
Escanaba	12,260	21	171.3	11,485	24	209.0
Flint	16,220	17	104.8	15,329	16	104.4
Grand Haven	5,611	5	89.1	5,363	6	111.9
Grand Rapids	101,833	114	111.9	97,756	104	106.4
Hancock	7,527	11	146.1	6,534	12	183.7
Hillsdale	5,303	5	94.3	4,974	6	120.6
Holland	9,848	8	81.2	9,260	12	129.6
Houghton	5,086	4	78.6	4,592	5	108.9
Ionia	5,232	8	152.9	5,225	6	114.8
Iron Mountain	8,092	4	49.4	8,421	11	130.6
Ironwood	10,255	8	78.0	10,098	5	49.5
Ishpeming	10,399	21	201.9	11,215	15	133.7
Jackson	25,390	31	122.1	25,330	32	126.3
Kalamazoo	33,816	51	150.8	31,127	44	141.4
Lansing	23,119	14	60.0	21,224	12	56.5
Laurium	9,161	10	109.2	8,156	6	73.6
Ludington	7,329	1	13.6	7,282	5	68.7
Manistee	11,544	24	207.9	12,320	15	121.8
Marquette	11,120	17	152.9	10,817	15	138.7
Menominee	9,805	8	81.6	10,666	9	84.4
Monroe	6,942	9	129.6	6,399	4	62.5
Mt. Clemens	7,507	14	186.5	7,241	11	151.9
Mt. Pleasant	5,101	2	39.2	4,690	4	85.3
Muskegon	20,956	25	119.3	20,917	24	114.7
Negaunee	6,694	9	134.4	6,763	8	118.3
Norway	5,385	6	111.4	5,038	3	59.5
Owosso	9,482	13	137.1	9,257	10	108.0
Petoskey	5,112	4	78.2	5,161	6	116.3
Pontiac	11,720	15	128.0	11,163	14	125.4
Port Huron	20,681	15	72.5	20,246	13	64.2
Saginaw	49,809	41	82.3	47,676	48	100.7
St. Joseph	5,447	5	91.8	5,364	4	74.6
Sault Ste. Marie	12,120	19	156.8	11,668	14	120.0
Traverse City	12,610	35	277.6	11,695	26	222.3
Wyandotte	5,607	8	142.7	5,486	8	145.8
Ypsilanti	7,744	8	103.3	7,639	8	104.7

* Estimated for intercensal years.

† Does not include West Bay City for 1904, which was consolidated with Bay City in 1905.

THE SEASONAL FATALITY OF TUBERCULOSIS.

As a rule, tuberculosis in the early stages is not recognized, and consequently the time of its inception is not generally known or reported. This, coupled with the fact that regular reports of the progress of many cases are lacking, renders it difficult to determine, with any degree of accuracy, the seasonal prevalence of the disease. Table 16 is, therefore, designed to take the place of a table showing the seasonal prevalence. The months of greatest fatality, named in the order of greatest numbers of deaths, were April, May and March; the months of least fatality being from July to September, inclusive.

TABLE 16—*The seasonal fatality from tuberculosis, in Michigan, as shown by the average number of deaths from this disease in each month in the fourteen years, 1894–1907.*

Months	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average number of deaths	161	162	176	182	178	151	142	143	141	156	149	164

LOCATION OF THE DISEASE IN TUBERCULOSIS.

Table 17 shows that for a period of thirteen years, ending in 1907, the disease was located in the lungs in nearly six times as many instances as in all the other organs of the body combined. Usually the disease was located in more than one part of the body, in many instances in several different organs or parts at the same time.

TABLE 17—*Location of the disease in tuberculous persons, in Michigan, during the thirteen years, 1895–1907.*

Part of the body.	No. of instances.	Part of the body.	No. of instances.	Part of the body.	No. of instances.
Abdomen	57	Iliac	2	Pleura	19
Alimentary canal	4	Inguinal	1	Rectum	14
Ankle	6	Intestines	199	Respiratory organs	4
Arm	2	Joints	8	Ribs	2
Back	5	Kidneys	84	Shoulder	3
Bladder	28	Knee	20	Side	12
Blood	8	Larynx	208	Skin	4
Bones	15	Leg	7	Spine	57
Bowels	830	Liver	77	Spleen	6
Brains	35	Lungs	18,206	Stomach	195
Breast	2	Lymph system	13	Suprarenal capsules	2
Bronchi	111	Mastoid	1	Testicle	3
Chest	103	Maxilla	1	Thigh	3
Elbow	2	Membranes	1	Thorax	27
Face	2	Meninges	8	Throat	71
Foot	6	Mesentery	37	Tongue	2
General	593	Muscles	2	Uterus	2
Glands	57	Neck	4	Vertebræ	1
Hand	2	Omentum	1	Windpipe	6
Head	13	Ovaries	2	Womb	3
Heart	15	Peritoneum	200		
Hip joint	64	Pharynx	9		

REPORTED SOURCES OF CONTAGIUM.

The difficulty experienced in tracing cases of tuberculosis to their source is nowhere better illustrated than in the very small number of reports received at this office from year to year which throw any light upon this phase of the study of tuberculosis, and it is probable that, in many instances, where a source is reported, the information is based upon circumstantial evidence, only. From the reports of tuberculosis in 1907, it is learned that 119 cases were traced to former cases of the disease, and that, in 323 instances, the patients had tuberculous relatives or associates.

In reply to the question, "Can you trace any other case of consumption or tuberculosis to this case?" the health officers answered "Yes" in 8 instances.

PREDISPOSING INFLUENCES AND PREMONITORY SYMPTOMS.

For the reason that very many cases of tuberculosis are not recognized or reported until the advanced stage has been reached, the information contained in past reports relative to the predisposing influences and premonitory symptoms in tuberculosis was, necessarily, very meagre and, probably, not entirely reliable. Since 1905, information along these lines was not asked for, but Table 18, which contains the information obtained during a period of nine years, is reprinted for the benefit of those who wish to make a study of the subject in connection with Table 7 in the preceding article on pneumonia. By a comparison of these tables, it may be seen that the predisposing influences are, practically, the same in tuberculosis as in pneumonia, and that both the tables emphasize the necessity for the "ounce of prevention" in the prompt and thorough treatment of a cold or cough, and in the institution of restrictive and preventive measures in cases of influenza, bronchitis, typhoid fever, measles, whooping-cough, etc.

TABLE 18—*Predisposing influences and premonitory symptoms in* SOME OF THE CASES OF *tuberculosis in Michigan, in the nine years, 1897–1905.*

Disease began with or followed.	No. of instances.	Disease began with or followed.	No. of instances.	Disease began wth or followed.	No. of instances.
Cough and cold	4,597	Fistula	5	Blood poisoning	1
Influenza	1,197	Heart trouble	5	Dropsy	1
Bronchitis	969	Scrofula	4	Ulceration of cornea	1
Pneumonia	634	Change of life	4	Aphonia	1
Hemorrhage	622	Hay fever	4	Insomnia	1
General debility	305	Typhoid pneumonia	4	Womb trouble	1
Pleurisy	87	Headache	4	Overexertion	1
Typhoid fever	67	Profuse expectoration	4	Complication of diseases	1
Catarrh	67	Pain in abdomen	4	Pain in shoulder	1
Bowel, stomach and intestinal trouble	60	Dyspepsia	3	Pus-infected hand	1
		Marasmus	3	Tape worm	1
Measles	53	Tubercular glands	3	Pelvic cellulitis	1
Asthma	39	Swelling in neck	3	Hardening of lungs	1
Child birth	38	Swelling of limbs	3	Softening of brain	1
Fever	35	Scarlet fever	3	Appendicitis	1
Diarrhea	34	Tonsilitis	3	Cholera infantum	1
Abscess	32	Paralysis	3	Ulceration of rectum	1
Throat trouble	31	Night sweats	3	Brain fever	1
Malarial fever	29	Gangrene of lungs	2	Enlargement of spleen	1
Whooping cough	26	Pharyngitis	2	Result of operation	1
Rheumatism	22	Lupus on face	2	Cancer	1
Glandular affection	20	Extreme nervousness	2	Pain in breast	1
Kidney and bladder trouble	13	Lumbago	2	Diphtheria	1
Pain in side	12	Curvature of spine	2	Sore mouth	1
Laryngitis	9	Tumor	2	Result of vaccination	1
After miscarriage	8	Diabetes	2	Peritonitis	1
Suppression of menses	8	Inhalation of dust	2	Pain in rectum	1
Injury	8	Pott's disease	2	Coughed up a pin which had been swallowed in childhood	1
Anemia	7	Empyema	2		
Liver trouble	6	Cigarette smoking	2	Choking and filling up	1

INFLUENCE OF AGE AND SEX IN TUBERCULOSIS.

Table 19 indicates that the greatest number of those of both sexes who died or recovered from tuberculosis were between the ages of 20 and 30 years. From infancy up to the age of 30 years there was a gradual increase, and from 30 to 80 a gradual decrease in the number of those who died or recovered. Of those who died between the ages of 1 and 40 years, the greater number were females, and of those who recovered between the ages of 10 and 40 years, the greater number were also females. Of those who died between the ages of 40 and 80 years, the greatest number were males, which was also true of those who recovered between the ages of 40 and 70 years. At all ages, the females constituted about 54 per cent of those who died.

The average age of fatal cases in the fourteen years, 1894-1907, was for males 36.5 years, and for females 32.7 years.

The average age of non-fatal cases in the fourteen years, 1894-1907, was for males 32.1 years, and for females 29.3 years.

TABLE 19—*The influence of age and sex in tuberculosis, as indicated by the number of those,* OF KNOWN AGES, *who died or recovered from this disease, in Michigan, in the fourteen years, 1894–1907. Arranged by sex, in age periods of ten years each.*

Age periods.	Died.						Recovered.		
	Number.			Per cent.			Number.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
Under 10 years	429	473	902	1.68	1.86	3.54	3	2	5
10 to 20 years	991	2,061	3,052	3.88	8.08	11.96	11	14	25
20 to 30 years	3,348	4,586	7,934	13.12	17.98	31.10	15	23	38
30 to 40 years	2,416	2,932	5,348	9.47	11.50	20.97	13	22	35
40 to 50 years	1,788	1,599	3,387	7.01	6.27	13.28	10	6	16
50 to 60 years	1,283	965	2,248	5.03	3.78	8.81	6	2	8
60 to 70 years	894	789	1,683	3.50	3.10	6.60	3	1	4
70 to 80 years	455	369	824	1.78	1.45	3.23	....	2	2
80 years and over	60	70	130	.24	.27	.51	....	....	....
All ages	11,664	13,844	25,508	45.71	54.29	100.00	61	72	133

INFLUENCE OF COLOR IN TUBERCULOSIS.

Table 20 indicates that, according to the proportion of white and colored persons in the population, tuberculosis was most prevalent among the colored population.

Of the colored population the disease was most prevalent among the Indians.

TABLE 20—*The color of some of the tuberculous persons, in Michigan, reported during the thirteen years, 1895–1907.*

Color.	Number of instances in which the color was stated.	Per cent of all tuberculous persons of whom the color was stated.	Approximate proportion of the total population of the State.—Expressed in per cents.
White	24,338	96.68	99.08
Black (Negro)	488	1.94	.64
Red (Indian)	345	1.37	.26
Yellow (Japanese)	2	.01	....

CIVIL CONDITION OF TUBERCULOUS PERSONS.

During the years 1895-1907, the reports of cases in which the civil condition of the patients was stated, showed that 58 per cent of the patients were or had been married, and that 42 per cent were single.

INFLUENCE OF OCCUPATION IN TUBERCULOSIS.

What has been said in the preceding article, relative to the influence of occupation in pneumonia, will apply equally to tuberculosis, as a comparison of Tables 10 and 21 will show.

During the thirteen years in which the occupations of tuberculous persons have been studied, very many cases were reported as having no occupation, as infants, inmates of charitable, penal and reformatory institutions, etc.

TABLE 21—*Occupations of 17,539 tuberculous persons, in Michigan, in the thirteen years, 1895–1907.*

Occupations.	Number of instances.	Occupations.	Number of instances.	Occupations.	Number of instances.
Housework	7,334	Baker	41	Motorman	4
Farmer	2,476	Nurse	38	Glassworker	4
Laborer	2,099	Laundry work	34	Butter maker	3
Student	968	Waiter	29	Rag picker and sorter	3
Clerk (office or store)	793	Minister	27	Tanner	3
Mechanic	453	Soldier	23	Porter	3
Merchant	451	Lawyer	23	Stereotyper	2
Dressmaker or milliner	230	Photographer	21	Diver	2
Teacher	215	Fisherman	19	Chiropodist	2
Machinist	182	Stone or marble cutter	18	Bootblack	2
Miner	171	Fireman	17	Scientist	2
Factory employe	169	Miller	14	Watchman	2
Painter or paper hanger	148	Electrician	14	Stock buyer	2
Teamster	138	Mail carrier	12	Broom maker	2
Salesman or agent	129	Plumber	12	Candymaker	2
Saloon man	126	Janitor	11	Harness maker	2
Railroad employe	115	Theatrical person	9	Chemist	2
Printer	90	Dentist	9	Balloonist	1
Barber	88	Metal polisher	9	Attendant in asylum	1
Cigar maker	85	Patrolman	6	Dancing master	1
Engineer	80	Woodworker	6	Prostitute	1
Sailor	65	Boomman	5	Feather renovator	1
Cook	62	Lumberman	5	Chimney sweep	1
Woodsman	61	Civil engineer or surveyor	5	Weaver	1
Artist	55	Undertaker	5	Papermaker	1
Tailor	47	Contractor and builder	5	Oculist	1
Moulder	47	Hairdresser	4	Milkman	1
Shoemaker	45	Hunter	4	Sewer inspector	1
Physician or surgeon	44	Veterinary surgeon	4	Cheesemaker	1
Gardener or florist	42	Athlete	4	Engraver	1
Musician	42			Messenger	1

DURATION OF SICKNESS IN TUBERCULOSIS.

In studying Table 22, it should be borne in mind that, in a large number of instances, the beginning of the disease was not definitely known, the duration periods given usually representing the time which elapsed between the recognition of the disease in an advanced stage and the death or recovery of the patient. This may be seen by the large number of cases of those who died or recovered at some time within one year of the reported time of commencement of the sickness.

TABLE 22—*The reported duration of sickness in 16,748 fatal and non-fatal cases of tuberculosis, in Michigan, during the fourteen years, 1894–1907.*

Duration periods.	Fatal cases.						Non-fatal cases.		
	Numbers.			Per cent.			Numbers.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males	Females.	Both sexes.
1 month	558	471	1,029	3.36	2.84	6.20	6	4	10
2 months	385	467	852	2.32	2.81	5.13	10	5	15
3 months	448	573	1,021	2.70	3.45	6.15	6	10	16
4 months	394	506	900	2.37	3.05	5.42	7	2	9
5 months	325	442	767	1.96	2.66	4.62	5	4	9
6 months	590	667	1,257	3.55	4.02	7.57	4	3	7
7 months	268	419	687	1.61	2.52	4.13	3	4	7
8 months	300	387	687	1.81	2.33	4.14	4	5	9
9 months	220	379	599	1.33	2.28	3.61	1	4	5
10 months	187	259	446	1.13	1.56	2.69	1	1	2
11 months	153	238	391	.92	1.43	2.35	3	1	4
Under 1 year	3,828	4,808	8,636	23.06	28.95	52.01	50	43	93
1 to 2 years	1,707	2,117	3,824	10.28	12.75	23.03	12	17	29
2 to 3 years	912	1,082	1,994	5.49	6.52	12.01	3	5	8
3 to 4 years	403	455	858	2.43	2.74	5.17	2	3	5
4 to 5 years	176	195	371	1.06	1.17	2.23	2	3	5
5 years and over	430	491	921	2.59	2.96	5.55	....	4	4
Totals	7,456	9,143	16,604	44.91	55.09	100.00	69	75	144

RESTRICTIVE AND PREVENTIVE MEASURES.

That the education of the people in matters pertaining to the restriction of tuberculosis has not produced the results which, considering the wide publicity given the subject, might have been anticipated, is indicated by Table 23. The destruction of the sputa—upon which the restriction of tuberculosis principally depends—was properly carried out in but forty-four per cent of all the cases which occurred in the years 1904-1907. It is not easy to place the blame for this condition, because it is believed that the members of the medical profession and the laity are both alive to the great importance of such restrictive measures, and well informed as to the simple methods of accomplishing the destruction of the infective material. In many cases the disease is not recognized, or the services of a physician called and restrictive measures begun until the patient is in the advanced stages of the disease.

In the pamphlet of instructions for the restriction and prevention of tuberculosis, issued by this Department, it is recommended that "All dejecta of a tuberculous person should be destroyed or disinfected; because it has been shown that the bacilli are to be found in the urine of persons having tubercular disease of the urinary organs, and in the fæces of those having tubercular disease of the bowels, and they may be in the fæces of those who swallow sputa containing the bacilli, that is, possibly, of any tuberculous person." And yet, in the years 1904-1907, in but 41 per cent of all cases reported in those years, in which the disease was located in the bowels, or bladder, were the discharges from these organs disinfected.

The disinfection of the rooms which the patient has occupied is of great importance, and is usually carried out in as many instances as other restrictive measures, but the disinfection is too often limited to the bedroom of the patient. Where a tuberculous person has had the run of the entire house,—as they usually do prior to the last stages of the sickness—the disinfection of the entire house would be a wise precaution. It is quite probable that, in nearly every case, the disinfection of the sitting room is quite as essential as the disinfection of the bedroom of the patient. The necessity for the disinfection of all the rooms occupied or frequented by tuberculous persons is emphasized by the fact that very many of the cases of tuberculosis reported to this Department are stated to be "Coughing Consumptives," many of whom do not take precautions, during a fit of coughing, to prevent droplets of sputa from being projected on to the walls and articles of furniture.

For the better restriction of tuberculosis, three lines of work, of paramount importance, and previously outlined in many publications of this Board, are here reiterated:

1. A careful study of the early symptoms of the disease, so that incipient cases may be more easily and more frequently recognized than at the present time.
2. Careful tuition of the patient in the best measures for preventing the spread of the disease to others, and for securing himself or herself against reinfection.
3. Painstaking and conscientious effort on the part of the patient to prevent himself or herself from becoming a center of infection.

The burden of this work must, of necessity, devolve upon the medical practitioners, and it is to them we must look mainly for any material reduction in the sickness and deaths from this disease.

To the patients, the duty of taking care of and destroying the sputa, the turning away of the face and covering the mouth and nostrils during a fit of coughing when in close promixity to others, the disinfection of the dejecta, and the thorough disinfection of all drinking vessels and other articles which may come in contact with the mouth, and which may be used by others as well as themselves, may seem irksome, and to some unnecessary and unimportant. Nevertheless, until this daily and hourly task shall become an integral part of every patient's daily life, we cannot hope for a successful termination of the warfare now being waged against this disease.

A person who, while suffering from tuberculosis, carelessly or willfully expectorates promiscuously and refuses to take precautionary measures, should be placed in detention until willing to comply with the simple and reasonable requirements laid down for his or her guidance.

TABLE 23—*Restrictive and preventive measures in tuberculosis, in Michigan, in the four years, 1904–1907.*

Restrictive and preventive measures.	Number of cases.	Per cent.
DISINFECTION OF SPUTA:		
Enforced	4,598	*44
Neglected	599	*6
Not stated, or statements doubtful	5,309	*50
DISINFECTION OF SOILED BEDDING, CLOTHING, ETC.:		
Enforced	5,957	55
Neglected	540	5
Not stated or statements doubtful	4,373	40
DISINFECTION OF DISCHARGES FROM BOWELS AND BLADDER:		
Enforced	227	†41
Neglected	210	†38
Not stated, or statements doubtful	122	†21
DISINFECTION OF ROOMS OCCUPIED BY PATIENTS:		
Enforced	5,268	48
Neglected	1,275	12
Not stated, or statements doubtful	4,327	40

* Disinfection of the sputa was not considered necessary in 364 instances, in which there was said to be no sputa, or in which the disease was said to be located only in the bowels, stomach, liver, etc., therefore this number has been deducted from the 10,870 cases, reported during the four years, before making the per cent.

† Disinfection of the bowel discharges was considered necessary in but 559 instances, i. e., where the disease was located solely, or in combination with some other organ, in the bowels, or in some other part of the body from which infection might leave the body by way of the bowels or bladder.

BACTERIOLOGICAL DIAGNOSIS IN TUBERCULOSIS.

During the thirteen years, 1895-1907, reports relative to the bacteriological examination of 2,753 samples of sputa of suspected cases of tuberculosis indicate that 95 per cent gave positive and 5 per cent negative results.

A more general examination of the sputa of persons who exhibit any of the premonitory symptoms of tuberculosis would, it is believed, be of great service in the early diagnosis of the disease, and thus enable the patients to begin treatment at a time when remedial measures would be of great value in arresting the further progress of the disease. The early recognition of the disease, followed by the prompt institution of restrictive and preventive measures, are the foundation principles of all efforts which have for their object the saving of the lives of the patients themselves and the prevention of the spread of the disease to others.

MENINGITIS IN MICHIGAN IN 1907 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1907, meningitis was reported to the Secretary of the State Board of Health from 279 localities, in which there were reported to have occurred 680 cases, including 670 deaths from this disease.

From the number of cases and deaths, shown in Table 24, it will be seen that, as a rule, only the fatal cases were reported.

Prior to 1904, the disease was considered under the various names reported, viz.: Cerebro-spinal meningitis, cerebral meningitis, meningitis, spinal meningitis, tubercular meningitis and traumatic meningitis. In the articles subsequent to 1903, all the various forms of the disease have been considered under the general title of meningitis.

For the purpose of learning what relation the number of cases and deaths from tubercular and traumatic meningitis bear to the total meningitis, these two forms of the disease have been considered separately in Table 26.

In the tables, wherever possible, totals, averages and per cents for a series of years, rather than for the single year 1907, have been shown.

By Table 24, it will be seen that, in 1899, when the statistical study of meningitis was first commenced by this Department, the disease was unusually prevalent, therefore the average of series of years beginning with 1899 is higher than it would be for similar periods under normal conditions.

Table 24 shows a much greater average death rate from meningitis in the years in which efforts have been made for its restriction and prevention than the average death rate for a long series of years prior to that time, shown in Table 25. This is probably due to the fact that, prior to 1898, under the old law for the registration of deaths, not all deaths were reported, and to the fact that the rates in Table 25 do not include tubercular meningitis, which, in recent years, has caused about 16 per cent of all the deaths from meningitis.

TABLE 24—*The prevalence of meningitis, in Michigan, in each of the nine years, 1899–1907.*

Years.	Population.*	Number of cases.†	Number of deaths.	Deaths per 100,000 population.
1899	2,426,331	1,306	1,079	44.5
1900	2,420,982	747	688	28.4
1901	2,448,241	614	594	24.3
1902	2,475,499	632	598	24.2
1903	2,502,758	645	630	25.2
1904	2,530,016	598	586	23.2
1905	2,557,275	675	646	25.3
1906	2,584,533	650	627	24.3
1907	2,611,792	680	670	25.7
Annual averages	2,506,381	727	680	27.1

* Estimated for intercensal years.

† From many localities, only the fatal cases were reported, so that the figures in this column do not accurately represent the number of cases which occurred.

TABLE 25—*The number of reported deaths from meningitis,* in Michigan, per 100,000 persons living, in each of the thirty years, 1869–1898. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Years	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
Deaths	1.2	.9	2.0	28.6	62.6	13.9	12.0	8.6	9.3	7.2	6.6	9.7
Years	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.
Deaths	19.6	13.0	12.7	12.8	9.2	9.4	9.3	9.6	8.0	8.6	9.6	6.8
Years	1893.	1894.	1895.	1896.	1897.	1898.†	Average, 1869–1898.					
Deaths	7.8	8.1	7.8	8.3	9.7	28.4	12.0					

* Does not include tubercular meningitis.

† Not all the deaths were reported under the old law, therefore a comparison of death rates for any year subsequent to 1897 with the death rates for any period prior to 1898 would not be reliable. The rates for the twenty-nine years, ending with 1897, probably quite accurately represent the annual fluctuations of the disease.

TABLE 26—*The reported numbers of cases and deaths from tubercular and traumatic meningitis, in Michigan, in the nine years, 1899–1907.*

Years.	Tubercular.				Traumatic.			
	Number of cases.	Number of deaths.	Per cent of all forms of meningitis.		Number of cases.	Number of deaths.	Per cent of all forms of meningitis.	
			Cases.	Deaths.			Cases.	Deaths.
1899	42	41	3	4	22	22	2	2
1900	93	83	12	12	17	17	2	2
1901	86	86	14	14	22	22	4	4
1902	96	94	15	16	8	8	1	1
1903	106	106	16	17	14	14	2	2
1904	126	133	21	23	24	24	4	4
1905	95	107	14	16	3	4	4	6
1906	108	106	17	17	9	8	1	1
1907	88	86	13	13	17	17	3	3

GEOGRAPHICAL DISTRIBUTION OF MENINGITIS.

Table 27 indicates that during the nine years, ending with 1907, meningitis was much more prevalent that the average for the State as a whole (shown in Table 24) in the Upper Peninsula and Southeastern Divisions. By the same standard, the disease was much more prevalent than the average in the counties of Houghton, Antrim, Keweenaw, Wexford, Baraga, Marquette, Wayne, Menominee, Cheboygan and Mecosta.

TABLE 27—*The geographical distribution of meningitis, in Michigan, in the nine years, 1899–1907, as indicated by the average numbers of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	269,198	116.9	106.9	39.7
Alger county	6,334	2	2	31.6
Baraga county	5,086	2	2	39.3
Chippewa county	21,741	5	5	23.0
Delta county	26,366	8	8	30.3
Dickinson county	18,453	5	5	27.1
Gogebic county	17,005	5	5	29.4
Houghton county	68,400	53	46	67.3
Iron county	8,871	1	1	11.3
Keweenaw county	4,174	2	2	47.9
Luce county	3,597	.9	.9	25.0
Mackinac county	7,992	2	2	25.0
Marquette county	40,192	17	16	39.8
Menominee county	26,394	9	9	34.1
Ontonagon county	6,963	3	1	14.4
Schoolcraft county	8,561	2	2	23.4
NORTHWESTERN DIVISION.	90,613	34	26	28.7
Benzie county	10,757	5	3	27.9
Grand Traverse county	22,845	6	5	21.9
Leelanau county	10,854	2	2	18.4
Manistee county	27,393	11	8	29.2
Wexford county	18,764	10	8	42.6
NORTHERN DIVISION.	83,300	27.3	24.2	29.1
Antrim county	15,677	8	7	44.7
Charlevoix county	15,626	3	3	19.2
Cheboygan county	16,956	7	6	35.4
Crawford county	3,584	.3	.2	5.6
Emmet county	17,132	6	5	29.2
Kalkaska county	7,403	2	2	27.0
Otsego county	6,922	1	1	14.4
NORTHEASTERN DIVISION.	59,785	10.6	9.5	15.9
Alcona county	5,656	.7	.7	12.4
Alpena county	19,653	4	3	15.3
Iosco county	10,307	2	2	19.4
Montmorency county	3,496	1	1	28.6
Ogemaw county	8,591	.8	.7	8.1
Oscoda county	1,819	.1	.1	5.5
Presque Isle county	10,263	2	2	19.5
WESTERN DIVISION.	276,905	82	74.9	27.0
Kent county	137,343	52	46	33.5
Lake county	5,010	1	.9	18.0
Mason county	19,679	4	4	20.3
Muskegon county	36,957	8	8	21.6
Newaygo county	18,228	3	3	16.5
Oceana county	17,599	3	3	17.0
Ottawa county	42,089	11	10	23.8
NORTHERN CENTRAL DIVISION.	106,691	30.4	27.2	25.5
Clare county	9,020	3	2	22.2
Gladwin county	8,060	1	1	12.4
Isabella county	24,032	7	6	25.0
Mecosta county	20,469	8	7	34.2
Midland county	14,812	4	4	27.0
Missaukee county	10,057	2	2	19.9
Osceola county	18,564	5	5	26.9
Roscommon county	1,677	.1	.2	11.9

* † These footnotes are below Table 24 on a preceding page.

TABLE 27.—Concluded.

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
Bay and Eastern Division.	347,098	75	73	21.0
Arenac county	9,959	1	1	10.0
Bay county	63,771	16	15	23.5
Huron county	35,075	6	6	17.1
Lapeer county	27,272	4	4	14.7
Saginaw county	84,693	18	18	21.3
Sanilac county	34,974	7	7	20.0
St. Clair county	55,308	14	13	23.5
Tuscola county	36,046	9	9	25.0
Central Division.	315,720	71	63	20.0
Barry county	22,254	7	6	27.0
Clinton county	25,283	5	4	15.8
Eaton county	31,098	7	6	19.3
Genesee county	42,559	8	8	18.8
Gratiot county	30,284	9	8	26.4
Ingham county	43,032	9	8	18.6
Ionia county	34,896	9	7	20.1
Livingston county	18,902	3	3	15.9
Montcalm county	33,515	8	7	20.9
Shiawassee county	33,897	6	6	17.7
Southwestern Division.	143,241	29	26	18.2
Allegan county	38,991	10	9	23.1
Berrien county	49,552	8	8	16.1
Cass county	20,283	4	3	14.8
Van Buren county	34,415	7	6	17.4
Southern Central Division.	324,006	72	68	21.0
Branch county	26,452	5	5	18.9
Calhoun county	52,499	10	10	19.0
Hillsdale county	29,835	5	5	16.8
Jackson county	47,388	12	11	23.2
Kalamazoo county	48,687	13	12	24.6
Lenawee county	48,971	9	9	18.4
St. Joseph county	23,471	7	6	25.6
Washtenaw county	46,703	11	10	21.4
Southeastern Division.	488,685	179	178	36.4
Macomb county	33,113	8	8	24.2
Monroe county	33,049	9	9	27.2
Oakland county	45,498	7	7	15.4
Wayne county	377,025	155	154	40.8

* † These footnotes are below Table 24 on a preceding page.

THE PREVALENCE OF MENINGITIS IN URBAN AND RURAL LOCALITIES.

Table 28 shows meningitis to have been present, in 1907, in 27 per cent of the incorporated cities and villages, whose population could be estimated for that year. There were 42 cities and villages whose populations could not be estimated for the year 1907, therefore these localities have been included with the rural localities, shown in the last line of Table 28.

As in the case of pneumonia and tuberculosis, previously considered, as a rule, meningitis was most prevalent in the large centers of population.

By Table 28A, it may be seen that, in 1907, the urban localities which showed much higher death rates from meningitis than the death rate for this disease for the entire State for that year were: Albion, Alpena, Cadillac, Calumet township, Coldwater, Detroit, Escanaba, Hancock, Ionia, Iron Mountain, Ironwood, Ishpeming, Kalamazoo, Ludington, Menominee, Mt. Pleasant, Negaunee, Petoskey, Sault Ste. Marie and Wyandotte.

The localities, shown in Table 28A, in which the death rates were much lower in 1907 than the rate for the entire State for that year were: Adrian, Flint, Grand Haven, Houghton, Lansing, Manistee, Marquette, Norway, Pontiac, Port Huron, St. Joseph and Ypsilanti.

The localities, shown in Table 28A, which showed much higher death rates from meningitis in 1907 than the average for such localities in the years 1904-6 were: Albion, Alpena, Battle Creek, Bay City, Cadillac, Coldwater, Detroit, Escanaba, Grand Haven, Holland, Houghton, Ionia, Iron Mountain, Ludington, Marquette, Mt. Clemens, Mt. Pleasant, Negaunee, Norway, Owosso, Saginaw, Sault Ste. Marie and Ypsilanti.

The localities, shown in Table 28A, which showed much lower death rates from meningitis in 1907 than the average for such localities in the years 1904-6 were: Adrian, Calumet township, Cheboygan, Flint, Ironwood, Port Huron and Traverse City.

There were no deaths from meningitis in 1907 in Benton Harbor, Charlotte, Hillsdale, Laurium and Monroe.

TABLE 28—*The prevalence of meningitis in urban and rural localities in Michigan in 1907.*

Localities—grouped according to density of population.	Population.*	Health jurisdictions.			Cases.†	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected. Number.	Infected. Per cent of all jurisdictions.			
Cities over 50,000	451,507	2	2	100	241	242	53.6
Cities from 25,000 to 50,000	149,577	4	4	100	44	40	26.7
Cities from 10,000 to 25,000 and Calumet township (18,253)	255,174	17	17	100	68	66	25.9
Cities and villages from 5,000 to 10,000	175,993	26	22	85	54	55	31.3
Cities and villages under 5,000‡	361,839	332	56	17	71	70	19.3
Total urban	1,394,090	381	101	27	478	473	33.9
Balance of localities—principally townships§	1,217,702	1,264	178	14	202	197	16.2

* † These footnotes are below Table 27.

‡ Exclusive of forty-two villages, for which the population in 1907 cannot be correctly estimated.

§ Includes the forty-two villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

TABLE 28 A—*The deaths from meningitis in 1907, and preceding years, in each of the principal localities included in the first four groups in Table 28.*

Localities.	1907.			Average, 1904–1906.		
	Population.*	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Deaths.	Deaths per 100,000 inhabitants.
Adrian	11,450	1	8.7	10,937	4	36.6
Albion	5,261	3	57.0	5,049	2	39.6
Alpena	12,849	5	38.9	12,550	3	23.9
Ann Arbor	14,667	4	27.3	14,619	4	27.4
Battle Creek	24,951	5	20.0	23,126	3	13.0
Bay City	40,562	9	22.2	36,282	† 6	16.5
Benton Harbor	6,807	0	....	6,737	2	29.7
Cadillac	7,565	5	66.1	7,117	1	14.1
Calumet township	18,253	7	38.3	17,518	15	85.6
Charlotte	5,202	0	....	4,885	3	61.4
Cheboygan	6,911	2	28.9	6,790	4	58.9
Coldwater	6,232	3	48.1	6,227	2	32.1
Detroit	349,674	217	62.1	328,114	151	46.0
Escanaba	12,260	6	48.9	11,485	4	34.8
Flint	16,220	2	12.3	15,329	5	32.6
Grand Haven	5,611	1	17.8	5,363	.7	13.1
Grand Rapids	101,833	25	24.5	97,756	30	30.7
Hancock	7,527	4	53.1	6,534	4	61.2
Hillsdale	5,303	0	....	4,974	.3	6.0
Holland	9,848	3	30.5	9,260	2	21.6
Houghton	5,086	1	19.7	4,592	.7	15.2
Ionia	5,232	3	57.3	5,225	0	....
Iron Mountain	8,092	3	37.1	8,421	2	23.8
Ironwood	10,255	2	19.5	10,098	3	29.7
Ishpeming	10,399	8	76.9	11,215	8	71.3
Jackson	25,390	7	27.6	25,330	6	23.7
Kalamazoo	33,816	11	32.5	31,127	10	32.1
Lansing	23,119	3	13.0	21,224	3	14.1
Laurium	9,161	0	....	8,156	2	24.5
Ludington	7,329	4	54.6	7,282	.3	4.1
Manistee	11,544	2	17.3	12,320	2	16.2
Marquette	11,120	2	18.0	10,817	1	9.2
Menominee	9,805	4	40.8	10,666	5	46.9
Monroe	6,942	0	....	6,399	2	31.3
Mt. Clemens	7,507	2	26.6	7,241	.7	9.7
Mt. Pleasant	5,101	3	58.8	4,690	1	21.3
Muskegon	20,956	6	28.6	20,917	5	23.9
Negaunee	6,694	4	59.8	6,763	3	44.4
Norway	5,385	1	18.6	5,038	.3	6.0
Owosso	9,482	3	31.6	9,257	2	21.6
Petoskey	5,112	2	39.1	5,161	2	38.8
Pontiac	11,720	2	17.1	11,163	2	17.9
Port Huron	20,681	2	9.7	20,246	5	24.7
Saginaw	49,809	13	26.1	47,676	8	16.8
St. Joseph	5,447	1	18.4	5,364	1	18.6
Sault Ste. Marie	12,120	6	49.5	11,668	3	25.7
Traverse City	12,610	3	23.8	11,695	4	34.2
Wyandotte	5,607	2	35.7	5,486	2	36.5
Ypsilanti	7,744	1	12.9	7,639	.7	9.2

* Estimated for intercensal years.

† Does not include West Bay City for 1904, which was consolidated with Bay City in 1905.

THE SEASONAL PREVALENCE OF MENINGITIS.

Table 29 is compiled from two different sources, and shows that meningitis is most prevalent in the months of March, April and May, and least prevalent in the months of October, November and December. This coincides with the results of observations made in epidemics of meningitis in this and other counties, notably, the outbreak in New York in 1892 and 1893, which was most violent in May; the epidemic in Cologne in 1895, which reached its maximum in April; and the epidemic in Strasburg in 1841, in which the greatest number of cases occurred in March.

TABLE 29—*The seasonal prevalence of meningitis, in Michigan, in so far as indicated by the average number of persons taken sick and who died from this disease in each month in the nine years, 1899–1907.*

Months	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average number of those taken sick	41	44	70	65	55	39	41	39	40	34	29	31
Average number of deaths	45	49	66	68	62	46	46	44	42	38	31	35

TABLE 30—*The reported sources of contagium and predisposing influences in meningitis, in Michigan, in the nine years, 1899–1907.*

Source and predisposing influence.	Number of instances.
Traced to a former case of meningitis in another person	82
Following an attack, in the same person, of	
Influenza	115
Pneumonia	82
Tuberculosis	58
Bronchitis	28

TABLE 31—*Meningitis in Michigan, in the four years, 1904–1907, and previous and contemporaneous cases of meningitis, tuberculosis, influenza and pneumonia, which occurred in the same families in which the meningitis patients resided.*

Diseases.	The time which elapsed between cases of meningitis in 1904-1907 and previous and contemporaneous cases of the diseases named below, with the number of instances in each period of time.														
	On or about the same time.	1 day.	3 days.	4 days.	10 days.	14 days.	18 days.	1 month.	2 months.	3 months.	4 months.	5 months.	6 months.	1 year and over.	No time stated.
Meningitis	18	2	1	......	1	2	......	......	1	......	1	......	1	1	6
Tuberculosis	23	......	......	1	......	2	1	1	3	3	1	......	2	7	21
Influenza	4	......	1	1	......	......	......	1	......	......	......	......	......	......	5
Pneumonia	2	......	......	......	......	......	......	......	1	......	......	1	1	......	4

REPORTED SOURCES OF CONTAGIUM AND PREDISPOSING INFLUENCES IN MENINGITIS.

By reference to Table 30 in the annual report of this Department, for 1905, and to corresponding tables in preceding reports, it may be seen that, as compared with the total number of cases of meningitis reported to this Department, the number of instances in which the sources of contagium and the predisposing influences in meningitis were reported were very small. For this reason, in 1906 and 1907, health officers were only requested to supply information relative to those cases which were traced to former cases of the disease, or which followed the four diseases, shown in Table 30 in this article, which are intimately associated with meningitis.

Table 30 may well be studied in connection with Table 31, and when continued for a number of years, Table 31 will probably be of much value in determining the connection between outbreaks of meningitis and the other diseases named in the table.

THE INFLUENCE OF AGE AND SEX IN MENINGITIS.

Table 32 confirms what has been stated in preceding reports relative to meningitis, that it is essentially a disease of childhood, nearly 57 per cent of all the fatal cases, in which the age was stated, during the nine years ending in 1907, having occurred in children under five years of age. There was a gradual decrease in the number of deaths corresponding with each increase in the ages.

With but one exception (ages 10 to 14 years), meningitis was most fatal among the male population at all ages shown in the table.

TABLE 32—*The influence of age and sex in meningitis, in Michigan, as indicated by the number of those, of known ages, who died from this disease in the nine years, 1899–1907 Arranged by sex, in age periods of five years each.*

Age periods.	Number of deaths.			Per cent.			Average deaths per year.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
Under 5 years	1,940	1,477	3,417	32.06	24.40	56.46	216	164	380
5 to 9 years	344	335	679	5.68	5.54	11.22	38	37	75
10 to 14 years	182	197	379	3.01	3.25	6.26	20	22	42
15 to 19 years	202	164	366	3.34	2.71	6.05	22	18	40
20 to 24 years	129	109	238	2.13	1.80	3.93	14	12	26
25 to 29 years	92	81	173	1.52	1.34	2.86	10	9	19
30 to 34 years	74	64	138	1.22	1.06	2.28	8	7	15
35 to 39 years	80	55	135	1.32	.91	2.23	9	6	15
40 to 44 years	67	51	118	1.11	.84	1.95	7	6	13
45 to 49 years	56	43	99	.93	.71	1.64	6	5	11
50 years and over	191	119	310	3.15	1.97	5.12	21	13	34
All ages	3,357	2,695	6,052	55.47	44.53	100.00	371	299	670

THE DURATION OF SICKNESS IN MENINGITIS.

Table 33 shows that of 3,281 fatal cases of meningitis in the seven years, 1901-1907, nearly 38 per cent of the deaths occurred between the first and fifth days; nearly 63 per cent between the first and tenth days, and nearly 78 per cent between the first and fifteenth days.

TABLE 33—*The duration of sickness in fatal cases of meningitis, of known duration, in Michigan, in the seven years, 1901–1907. Arranged by sex in five day periods.*

Duration periods.	Number of deaths.			Per cent.			Average deaths per year.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
1 to 5 days	718	516	1,234	21.88	15.73	37.61	103	74	177
6 to 10 days	424	400	824	12.92	12.19	25.11	61	57	118
11 to 15 days	259	239	498	7.89	7.28	15.17	37	34	71
16 to 20 days	109	113	222	3.32	3.44	6.76	16	16	32
21 to 25 days	87	76	163	2.65	2.32	4.97	12	11	23
26 to 30 days	42	39	81	1.28	1.19	2.47	6	6	12
31 to 35 days	24	20	44	.73	.61	1.34	3	3	6
36 to 40 days	14	14	28	.43	.43	.85	2	2	4
41 to 45 days	17	11	28	.52	.34	.86	2	2	4
46 to 50 days	8	12	20	.24	.37	.61	1	2	3
51 days and over	77	62	139	2.35	1.89	4.24	11	9	2
Totals and averages	1,779	1,502	3,281	54.21	45.79	100.00	254	216	470

RESTRICTIVE AND PREVENTIVE MEASURES IN MENINGITIS.

As may be seen by reference to Table 34, information relative to the restrictive and preventive measures in meningitis has been very meagre.

As indicated by those reports in which a *definite* statement was made relative to the restrictive and preventive measures in meningitis in the four years, 1904-7, but a small proportion of the patients were isolated from all persons, excepting the nurses and attending physicians. A somewhat better showing is made in regard to the disinfection of sputa, articles liable to be soiled by sputa and the rooms occupied by the sick persons.

TABLE 34—*Restrictive and preventive measures in meningitis, in Michigan, in the four years, 1904–1907.*

Restrictive and preventive measures.	Number of cases.	Per cent.
ISOLATION:		
Enforced	538	21
Neglected	672	26
Not stated, or statements doubtful	1,393	53
DISINFECTION OF SPUTA:		
Enforced	608	*25
Neglected	364	*15
Not stated, or statements doubtful	1,484	*60
DISINFECTION OF BEDDING, CLOTHING, ETC., SOILED BY SPUTA:		
Enforced	954	*39
Neglected	329	*13
Not stated or statements doubtful	1,173	*48
DISINFECTION OF ROOM OCCUPIED BY PATIENT:		
Enforced	1,331	51
Neglected	437	17
Not stated, or statements doubtful	835	32

* One hundred and forty-seven cases, in which there was said to be no sputa, excluded in making this per cent.

TYPHOID FEVER IN MICHIGAN IN 1907 AND PRECEDING YEARS.

GENERAL PREVALENCE.

By Table 35, it may be seen, that, in 1907, typhoid fever was less prevalent than in 1906 and slightly more prevalent than in the average year.

A comparison of Table 35 with Table 36 will show that the average death rate from typhoid fever in the years since 1884—when active measures for its restriction were instituted by this Department is considerably lower than in the fifteen years preceding 1884. It will also be seen that, in the years 1884-1897, inclusive, as a rule, the annual death rates were much lower than the rates in subsequent years. The higher death rates in the years 1898-1907 may be accounted for partly by the fact that, prior to 1898, under the old law for the registration of deaths, not all deaths were reported. It will be seen, however, that, in the ten years ending with 1907, the death rates from typhoid fever have not decreased, as would be expected from the efforts put forth by this Department for the restriction of the disease. This is believed to be due to the fact that, in many localities which have public water supplies, there has been little, if any, provision made for the removal of sewage, necessitating a gradually increasing number of cesspools and resulting in a gradually increasing contamination of the underground bodies of water from which many persons in those localities derive their water supplies.

It is safe to say that no substantial decrease in the sickness and mortality from typhoid fever may be expected until every cesspool and shallow well shall have been abolished, and every public water supply permanently protected against contamination.

TABLE 35—*The prevalence of typhoid fever, in Michigam, in each of the twenty-four years, 1884–1907.*

Years.	Population.*	Reported cases.†	Reported Deaths.	Deaths per 100 cases.	Deaths per 100,000 of the population.
1884	1,853,658	969	290	27	15.6
1885	1,893,697	715	194	23	10.2
1886	1,933,735	1,194	282	18	14.6
1887	1,973,774	3,424	411	17	20.8
1888	2,013,812	1,511	310	21	15.4
1889	2,053,851	2,530	‡ 681	27	33.2
1890	2,093,889	1,924	304	16	14.5
1891	2,130,827	4,670	697	15	32.7
1892	2,167,765	2,591	538	21	24.8
1893	2,204,703	3,512	594	17	26.9
1894	2,241,641	2,805	506	18	22.6
1895	2,271,531	3,751	621	17	27.3
1896	2,301,421	2,506	409	16	17.8
1897	2,331,311	1,900	352	19	15.1
1898	2,361,201	2,874	634	24	26.9
1899	2,391,091	3,194	638	20	26.7
1900	2,420,982	5,122	920	18	38.0
1901	2,450,872	3,002	665	22	27.1
1902	2,475,499	2,456	596	24	24.1
1903	2,502,758	2,840	640	23	28.9
1904	2,530,016	3,028	731	24	29.7
1905	2,557,275	2,774	661	24	25.8
1906	2,584,533	3,163	785	25	30.4
1907	2,611,792	1,953	645	33	24.7
Averages per year	2,264,651	2,684	546	20	24.1

* Estimated for intercensal years.

† Many health officers reported only the fatal cases, so that the total number of cases for each year was much in excess of those given in this column.

‡ In an outbreak of typhoid fever at Negaunee, in 1889, 300 cases but no deaths were reported, therefore the deaths from typhoid fever for that year reported to the Secretary of State have been usd in place of those reported to the State Department of Health.

TABLE 36—*The number of deaths from typhoid fever,* in Michigan, per 100,000 persons living, in each of the fifteen years, 1869–1883. Compiled from reports to the Secretary of State.*

Years	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	Average 1869–1883.
Deaths	39.0	48.5	29.2	49.4	52.8	45.8	31.3	30.1	30.3	22.6	25.5	31.9	55.2	28.4	25.0	36.3

* Includes typho-malarial fever but not typhoid pneumonia.

GEOGRAPHICAL DISTRIBUTION.

Table 37 indicates that, in the seventeen years, 1891-1907, the death rate from typhoid fever in the Upper Peninsula Division was considerably higher than the average for the entire State for the same period (26.2 deaths per 100,000 inhabitants) and that this high death rate was due to unusual death rates in the counties of Baraga, Chippewa, Delta, Gogebic, Iron, Luce, Marquette and Menominee. The unusual death rates in each of these counties were due to high death rates, in certain years, in the following localities:

Baraga county—Baraga township, 1891, 1899; Baraga village, 1891, 1899.

Chippewa county—Superior township, 1899; Sault Ste. Marie city, 1893-4, 1900-6.

Delta county—Escanaba city, 1892-3, 1897-1907; Gladstone city, 1898-9, 1901-7.

Geogebic county—Bessemer city, 1893-4, 1896, 1900-1; Ironwood city, 1891, 1893, 1900, 1904-7.

Iron county—Hematite township, 1892; Iron River village, 1891, 1907; Crystal Falls city, 1891-2, 1906.

Luce county—Newberry village, 1900, 1903-4.

Marquette county—Michigammee township, 1891, 1893; Republic township, 1891, 1893; Wells township, 1904; Ishpeming city, 1891-2, 1894, 1897-8, 1900, 1903, 1907; Marquette city, 1892, 1895, 1899-1900, 1902, 1904-7; Negaunee city, 1891-4, 1896, 1898, 1902, 1904-7.

Menominee county—Spaulding township, 1891; Menominee city, 1891-6, 1899-01, 1903-7.

In addition to the foregoing, in the counties of Emmet, Ingham, Kent, Midland, Missaukee, Otsego and Wexford, the death rates from typhoid fever in the seventeen years, 1891-1907, were much higher than the average for the State as a whole, but, by reason of the low death rates in other counties in the same geographical divisions, the death rates of the geographical division in which these counties are located do not differ greatly from the average for the entire state. The high death rates in the six counties under consideration were due to high death rates, in certain years, in the following localities:

Emmet county—Little Traverse township, 1891; Springvale township,

TABLE 37—*The geographical distribution of typhoid fever, in Michigan, in the seventeen years, 1891–1907, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
Upper Peninsular Division.	242,867	568	86.7	35.7
Alger county	4,751	3	.5	10.5
Baraga county	4,723	24	3	63.5
Chippewa county	18,888	53	8	42.4
Delta county	23,231	44	12	51.7
Dickinson county	17,002	33	4	23.5
Gogebic county	15,935	82	7	43.9
Houghton county	57,355	81	14	24.4
Iron county	7,452	11	3	40.3
Keweenaw county	3,486	5	.7	20.1
Luce county	3,051	5	1	32.8
Mackinac county	7,715	4	.5	6.5
Marquette county	39,687	133	17	42.8
Menominee county	25,136	57	13	51.7
Ontonagon county	6,463	13	1	15.5
Schoolcraft county	7,992	20	2	25.0
Northwestern Division.	83,991	110	24	28.6
Benzie county	9,562	19	3	31.4
Grand Traverse county	20,485	35	6	29.3
Leelanau county	10,256	5	2	19.5
Manistee county	27,025	27	7	25.9
Wexford county	16,663	24	6	36.0
Northern Division.	73,445	107	19.5	26.6
Antrim county	14,296	19	4	28.0
Charlevoix county	13,565	14	3	22.1
Cheboygan county	15,642	18	2	12.8
Crawford county	3,201	5	.5	15.6
Emmet county	14,152	27	5	35.3
Kalkaska county	6,620	8	2	30.2
Otsego county	5,969	16	3	50.3
Northeastern Division.	56,250	47	11.6	20.6
Alcona county	5,585	4	.8	14.3
Alpena county	18,893	12	4	21.2
Iosco county	11,369	8	2	17.6
Montmorency county	3,038	3	.7	23.0
Ogemaw county	7,267	8	2	27.5
Oscoda county	1,837	4	.1	5.4
Presque Isle county	8,261	8	2	24.2
Western Division.	269,662	425	81	30.0
Kent county	130,917	300	48	36.7
Lake county	5,476	6	1	18.3
Mason county	19,229	17	6	31.2
Muskegon county	37,327	27	7	18.8
Newaygo county	18,733	19	6	32.0
Oceana county	17,212	24	4	23.2
Ottawa county	40,768	32	9	22.1
Northern Central Division.	101,111	144	26.3	26.0
Clare county	8,595	12	2	23.3
Gladwin county	6,637	10	1	15.1
Isabella county	22,968	33	5	21.8
Mecosta county	20,708	24	6	29.0
Midland county	14,166	26	5	35.3
Missaukee county	8,687	21	3	34.5
Osceola county	17,678	16	4	22.6
Roscommon county	1,672	2	.3	17.9

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* † These footnotes are below Table 35 on a preceding page.

TABLE 37.—CONCLUDED.

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
BAY AND EASTERN DIVISION.	342,402	376	82.7	24.2
Arenac county	8,607	6	.7	8.1
Bay county	63,056	56	20	31.7
Huron county	33,952	30	6	17.7
Lapeer county	28,007	29	6	21.4
Saginaw county	83,756	66	15	17.9
Sanilac county	34,620	51	10	28.9
St. Clair county	54,980	98	17	30.9
Tuscola county	35,424	40	8	22.6
CENTRAL DIVISION.	315,140	419	78	24.8
Barry county	22,906	23	3	13.1
Clinton county	25,712	42	8	31.1
Eaton county	31,836	48	7	22.0
Genesee county	41,635	38	8	19.2
Gratiot county	29,694	44	8	26.9
Ingham county	41,559	91	16	38.5
Ionia county	34,871	43	10	28.7
Livingston county	19,594	22	3	15.3
Montcalm county	33,831	27	8	23.6
Shiawassee county	33,502	41	7	20.9
SOUTHWESTERN DIVISION.	140,486	150	32	22.8
Allegan county	39,108	29	7	17.9
Berrien county	47,852	49	12	25.1
Cass county	20,687	25	4	19.3
Van Buren county	32,839	47	9	27.4
SOUTHERN CENTRAL DIVISION.	317,543	397	69	21.7
Branch county	26,308	31	6	22.8
Calhoun county	50,281	70	13	25.9
Hillsdale county	29,998	23	5	16.7
Jackson county	47,061	79	12	25.5
Kalamazoo county	45,694	81	10	21.9
Lenawee county	48,772	61	11	22.6
St. Joseph county	24,205	21	5	20.7
Washtenaw county	45,224	31	7	15.5
SOUTHEASTERN DIVISION.	449,422	298	115	25.6
Macomb county	32,783	41	8	24.4
Monroe county	33,101	38	8	24.2
Oakland county	44,186	31	7	15.8
Wayne county	339,352	188	92	27.1

* † These footnotes are below Table 35 on a preceding page.

1905; Harbor Springs village, 1891, 1893, 1895, 1897, 1903-6; Petoskey City, 1897-1902, 1906.

INGHAM COUNTY—Alaiedon township, 1899-1900; Aurelius township, 1896; Delhi township, 1891, 1894-5, 1898-9; Ingham township, 1898-9; Lansing township, 1901, 1903-4; Le Roy township, 1898; Leslie township, 1894; Locke township, 1903; Meridian township, 1899, 1900, 1903; Stockbridge township, 1891-2; Vevay township, 1902; White Oak township, 1900; Williamston township, 1891-2, 1898; Stockbridge village, 1900; Lansing city, 1891, 1893-8, 1900-06.

KENT COUNTY—Ada township, 1900; Byron township, 1899; Grand

Rapids township, 1903; Lowell township, 1891; Paris township, 1900; Plainfield township, 1891; Sparta township, 1895, 1900; Walker township, 1894, 1899, 1903; Wyoming township, 1895, 1904-7; Lisbon village, 1900; Sparta village, 1906; Grand Rapids city, 1891-1907.

Midland county—Ingersoll township, 1898; Larkin township, 1900; Warren township, 1898, 1901, 1907; Coleman village, 1894; Midland city, 1895, 1899, 1901-2, 1904, 1907.

Missaukee county—Norwich township, 1899, 1900; Reeder township, 1891, 1894, 1895; Richland township, 1893, 1900; Riverside township, 1891; Lake City village, 1893; McBain village, 1894, 1898.

Otsego county—Corwith township, 1891, 1899; Hayes township, 1900; Gaylord village, 1891, 1898, 1900, 1902-4.

Wexford county—Boon township, 1892; Greenwood township, 1900, 1903; Slagle township, 1898; South Branch township, 1891; Springville township, 1894, 1898, 1900; Harrietta village, 1892; Cadillac city, 1893, 1900-1, 1903, 1905-6.

THE PREVALENCE OF TYPHOID FEVER IN URBAN AND RURAL LOCALITIES.

Table 38 indicates that, in 1907, typhoid fever was more prevalent in urban than in rural localities.

In the urban localities, typhoid fever was most prevalent in the group of localities having populations of from 10,000 to 25,000, and least prevalent in the group having populations of less than 5,000.

By comparison of the death rates in Table 38 with the death rate from typhoid fever, in 1907, for the State as a whole, shown in Table 35, it will be seen that the death rates for the first and third groups of localities in Table 38 are considerably higher than the rate for the entire State in that year.

The localities in each of the first four groups in Table 38, together with the reported sickness and deaths from typhoid fever in each locality, in 1907 and in the average year, are shown in Table 38A.

By Table 38A, it may be seen that, in 1907, the urban localities which showed much higher death rates from typhoid fever than the death rate for this disease for the entire State for that year were: Adrian, Bay City, Calumet township, Detroit, Escanaba, Flint, Grand Rapids, Ionia, Ironwood, Ishpeming, Laurium, Manistee, Marquette, Menominee, Mt. Clemens, Negaunee, Port Huron, St. Joseph and Wyandotte.

The localities, shown in Table 38A, in which the death rates from typhoid fever were much lower in 1907 than the rate for the entire State for that year were: Alpena, Ann Arbor, Grand Haven, Hancock, Holland, Kalamazoo, Lansing, Ludington, Muskegon, Norway, Owosso, Saginaw and Sault Ste. Marie.

The localities, shown in Table 38A, which showed much higher death rates from typhoid fever in 1907 than the average for such localities in the years 1904-6 were: Adrian, Albion, Calumet township, Detroit, Flint, Houghton, Ionia, Iron Mountain, Ishpeming, Laurium, Manistee, Marquette, Menominee, Norway, Owosso, Port Huron and St. Joseph.

The localities, shown in Table 38A, which showed much lower death rates from typhoid fever in 1907 than the average for such localities in the years 1904-6 were: Alpena, Ann Arbor, Battle Creek, Grand Rapids, Hancock, Jackson, Kalamazoo, Lansing, Mt. Clemens, Muskegon, Negaunee, Saginaw, Sault Ste. Marie, and Traverse City.

There were no deaths from typhoid fever in 1907 in Benton Harbor, Cadillac, Cheboygan, Coldwater, Hillsdale, Monroe, Mt. Pleasant, Petoskey and Ypsilanti.

TABLE 38—*The prevalence of typhoid fever in urban and rural localities, in Michigan in 1907.*

Localities—grouped according to density of population.	Population.*	Health jurisdictions.			Cases.†	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected. Number.	Infected. Per cent of all jurisdictions.			
Cities over 50,000	451,507	2	2	100	299	142	31.5
Cities from 25,000 to 50,000	149,577	4	4	100	173	40	26.7
Cities from 10,000 to 25,000 and Calumet township (18,253)	255,174	17	17	100	352	108	42.3
Cities and villages from 5,000 to 10,000	175,993	26	24	92	99	50	28.4
Cities and villages under 5,000‡	361,839	332	129	39	354	93	25.7
Total urban	1,394,090	381	176	46	1,277	433	31.1
Balance of localities—principally townships§	1,217,702	1,264	376	30	676	212	17.4

* † These footnotes are below Table 35 on a preceding page.

‡ Exclusive of forty-two villages, for which the population in 1907 cannot be correctly estimated.

§ Includes the forty-two villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

TABLE 38 A—*The prevalence of typhoid fever in 1907, and preceding years, in each of the principal localities included in the first four groups in Table 38.*

Localities.	1907.				Average, 1904–1906.			
	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.
Adrian	11,450	†	4	34.9	10,937	†	2	18.3
Albion	5,261	5	1	19.0	5,049	5	0	....
Alpena	12,849	†	2	15.6	12,550	†	5	39.8
Ann Arbor	14,667	12	1	6.8	14,619	9	2	13.7
Battle Creek	24,951	24	6	24.0	23,126	51	9	38.9
Bay City	40,562	†	18	44.4	36,282	†	‡17	46.9
Benton Harbor	6,807	2	0	....	6,737	4	1	14.8
Cadillac	7,565	3	0	....	7,117	25	4	56.2
Calumet township	18,253	46	8	43.8	17,518	10	1	5.7
Charlotte	5,202	4	1	19.2	4,885	12	1	20.5
Cheboygan	6,911	0	0	....	6,790	5	1	14.7
Coldwater	6,232	1	0	....	6,227	7	.7	11.2
Detroit	349,674	†	109	31.2	328,114	†	76	23.2
Escanaba	12,260	†	28	228.4	11,485	†	24	209.0
Flint	16,220	18	7	43.2	15,329	§12	5	32.6
Grand Haven	5,611	†	1	17.8	5,363	5	1	18.6
Grand Rapids	101,833	193	33	32.4	97,756	510	51	52.2
Hancock	7,527	0	1	13.3	6,534	†	3	45.
Hillsdale	5,303	4	0	....	4,974	5	2	40.2
Holland	9,848	8	1	10.2	9,260	8	1	10.8
Houghton	5,086	†	1	19.7	4,592	†	.3	6.5
Ionia	5,232	†	5	95.6	5,225	9	3	57.4
Iron Mountain	8,092	†	2	24.7	8,421	†	1	11.9
Ironwood	10,255	†	5	48.8	10,098	†	5	49.5
Ishpeming	10,399	17	6	57.7	11,215	§7	1	8.9
Jackson	25,390	45	7	27.6	25,330	88	11	43.4
Kalamazoo	33,816	68	6	17.7	31,127	71	9	28.9
Lansing	23,119	31	3	13.0	21,224	§53	13	61.3
Laurium	9,161	†	6	65.5	8,156	.3	.3	3.7
Ludington	7,329	†	1	13.6	7,282	4	1	13.7
Manistee	11,544	15	6	52.0	12,320	14	2	16.2
Marquette	11,120	18	9	80.9	10,817	19	4	37.0
Menominee	9,805	†	13	132.5	10,666	†	10	93.8
Monroe	6,942	0	0	....	6,399	3	1	15.6
Mt. Clemens	7,507	†	3	40.0	7,241	§16	4	55.2
Mt. Pleasant	5,101	5	0	....	4,690	12	2	42.6
Muskegon	20,956	14	3	14.3	20,917	24	6	28.7
Negaunee	6,694	10	3	44.8	6,763	14	4	59.1
Norway	5,385	3	1	18.6	5,038	5	.7	13.9
Owosso	9,482	5	1	10.5	9,257	5	2	21.6
Petoskey	5,112	6	0	....	5,161	14	1	19.4
Pontiac	11,720	†	3	25.6	11,163	†	3	26.9
Port Huron	20,681	54	12	58.0	20,246	17	8	39.5
Saginaw	49,809	42	9	18.1	47,676	46	18	37.8
St. Joseph	5,447	†	3	55.1	5,364	4	.7	13.0
Sault Ste. Marie	12,120	28	2	16.5	11,668	§19	6	51.4
Traverse City	12,610	30	3	23.8	11,695	67	6	51.3
Wyandotte	5,607	†	6	107.0	5,486	†	6	109.4
Ypsilanti	7,744	2	0	....	7,639	§2	1	13.1

* Estimated for intercensal years.

† Fatal cases only reported.

‡ Does not include West Bay City for 1904, which was consolidated with Bay City in 1905.

§ Average for two years only.

THE REPORTED SOURCES OF CONTAGIUM IN TYPHOID FEVER.

In the seventeen years, 1891-1907, sixty-five per cent of all the cases of typhoid fever were not traced to their source. This is to be regretted, because if in any outbreak of typhoid fever, the source of the disease is promptly located and removed, and proper measures taken to prevent the further spread of the disease from the sick person, or persons, the disease may usually be restricted to those persons who were infected prior to the recognition of the disease at the beginning of the outbreak.

Of the cases of typhoid fever in which a source of contagium was given, as shown in Table 39, about fifty-eight per cent were said to be due to water or ice. This number would be much greater if the sources of all the cases were traced. For instance, in Grand Rapids, which has a contaminated water supply, there are several hundred cases of typhoid fever in each year, most of which are undoubtedly due to the water supply, and yet a source is not usually reported. This is also true of many other localities in which the water supplies are the undoubted source of the typhoid fever, but the connection is not traced or reported to this Department.

The comparatively large number of cases in which the infection was traced to outside jurisdictions, included, principally, those cases in which the patients were taken sick in a camp, or other place, away from home, and were removed to their homes, or to a hospital, in other health jurisdictions, to be cared for. The localities from which and to which typhoid fever was spread in 1906 are shown in Table 40.

The removal, from one locality to another, of a person suffering from typhoid fever is a dangerous practice, and is unlawful unless the same is done with the consent and under the supervision of the health officials of the locality to which the patient is to be removed.

The 2,631 cases which were said to be due to coming in contact with or nursing typhoid fever patients were probably due, in the main, to the neglect of proper precautions on the part of those in attendance upon the patients. Where the utmost care and cleanliness is observed by those in charge of cases of typhoid fever, cases due to secondary infection should be of rare occurrence. It often happens, however, that the nursing is done by some member of the family, who may also handle food, or assist in the preparation of meals, to be eaten by herself and other members of the family; and the hands may not always be disinfected and cleansed between the act of caring for the patient and the handling of the food.

It is probable that many of the cases of typhoid fever which occurred in the same household, camp, etc., and which were reported as due to secondary infection, were really due to the same source as the original case, or to primary infection.

An insanitary condition of premises, on which a case of typhoid fever occurred, would be considered a cause of typhoid fever only in so far as it might assist in the development and distribution of the germs of the disease. Thus, a badly constructed or neglected privy or cesspool might be an eyesore or a source of discomfort to those in the immediate vicinity for many years, and yet not be a cause of typhoid fever. Further, the leachings from such privy or cesspool might find their way into and contaminate the water supply, and the water be consumed without any apparent danger to those using it. But with the entrance to such privy or cesspool of the discharges from a person suffering, or recently recovered, from typhoid fever, these receptacles would then become centers of infection, and a positive danger to those living in their immediate vicinity, and to those using the water from any source into which the leachings from such receptacles might find their way. It is probable that very many of the 1,409 cases of typhoid fever in Table 39, attributed to insanitary surroundings, were due to infected water, and, in some instances, to infected milk or other food.

Cases of typhoid fever due to infected food are difficult to trace, and it is probable that the one per cent of cases, shown in Table 39, attributed to this source, does not nearly represent the actual number of cases resulting therefrom.

The cases of typhoid fever due to milk infection are probably represented to a considerable extent by the number of deaths from this disease in children under five years of age; and which constitute about four and one-half per cent of all the deaths from this disease.

The transmission of typhoid fever by flies is believed to play a more important part in the spreading of this disease than is generally supposed, but the connection between this source and individual cases of the disease cannot ordinarily be traced by those in charge of the public health service of the State. Wherever a common privy exists, there will always be a possibility of the infection of the contents of the pit by the discharges from an incipient or ambulatory case of typhoid fever, and a strong probability of its infection during and for some time subsequent to an outbreak of this disease on the premises where the privy is located. As there is little, if any, effort made to exclude the common house-fly from the common privies, and, in many instances, a very imperfect exclusion of them from our homes, from stores where articles of food are exposed for sale, and from the rooms where cases of typhoid fever are present, the probability of infection of food in the home and in the store is ever present.

It is possible that some of the twenty-two cases of typhoid fever, in Table 39, attributed to infected houses and articles of clothing, etc., were really due to infection in a well, privy or cesspool, rather than to infection in the house itself.

TABLE 39—*The principal reported sources of contagium in 18,269 cases of typhoid fever in Michigan in the seventeen years, 1891–1907.*

Reported sources.	Number of cases.	Per cent of cases in which the source was known.
Water and ice	10,504	57.5
Outside jurisdictions	3,419	18.7
Traced to former cases in same locality	2,631	14.4
Insanitary surroundings (defective sewerage, filth, etc.)	1,409	7.7
Milk and other foods	243	1.3
Flies	41	.2
Infected houses and articles of clothing, etc	22	.1
Sources not stated or doubtful	33,872	*65.0

* Per cent of all cases which were reported.

TABLE 40—*Localities from which and to which typhoid fever was spread during the year 1907.*

Spread from:	To:	Spread from:	To:
Alcona county, Millen township.	Ogemaw county, West Branch township.	Emmet county, Bear Creek township.	Emmet county, Petoskey city.
Alpena county, Alpena city.	Presque Isle county, Belknap township.	Genesee county, Flint city.	Shiawassee county, Corunna city.
Antrim county, Mancelona village.	Wexford county, Cadillac city.	Genesee county, Linden village.	Tuscola county, Millington village.
Barry county, Barry township.	Kalamazoo county, Kalamazoo city.	Grand Traverse county, Long Lake township.	Benzie county, Almira township.
Bay county, Bay City.	Arenac county, Standish city.	Houghton county, Calumet township.	Eaton county, Charlotte city.
Bay county, Bay City,	Montcalm county, Greenville city.	Ingham county, Lansing city.	Clinton county, Victor township.
Bay county, Bay City.	Shiawassee county, Corunna city.	Ingham county, Lansing city.	Ingham county, Ingham township.
Benzie county, Frankfort village.	Benzie county, Crystal Lake township.	Ingham county, Lansing city.	Ionia county, Ionia township.
Benzie county, Frankfort village.	Manistee county, Manistee city.	Isabella county, Mt. Pleasant city.	Isabella county, Denver township.
Calhoun county, Battle Creek city.	Eaton county, Bellevue township.	Jackson county, Blackman township.	Jackson county, Jackson city.
Calhoun county, Battle Creek city.	Lenawee county, Hudson city.	Jackson county, Summit township.	Jackson county, Jackson city.
Calhoun county, Battle Creek city.	Shiawassee county, Durand village.	Kalamazoo county, Alamo township.	Kalamazoo county, Kalamazoo city.
Cass county, Dowagiac city.	Van Buren county, Porter township.	Kalamazoo county, Kalamazoo city.	Cass county, Dowagiac city.
Chippewa county, Whitefish township.	Chippewa county, Sault Ste. Marie city.	Kalamazoo county, Oshtemo township.	Kalamazoo county, Kalamazoo city.
Delta county, Escanaba city.	Schoolcraft county, Manistique city.	Kalamazoo county, Portage township.	Kalamazoo county, Kalamazoo city.
Dickinson county, Waucedah township.	Dickinson county, Norway city.	Kalkaska county, Rapid River township.	Antrim county, Helena township.

TABLE 40.—CONTINUED.

Spread from:	To:	Spread from:	To:
Kent county, Grand Rapids city.	Benzie county, Thompsonville village.	Manistee county, Manistee city.	Manistee county, Filer township.
Kent county, Grand Rapids city.	Eaton county, Sunfield township.	Marquette county, Forsyth township.	Marquette county, Ishpeming city.
Kent county, Grand Rapids city.	Eaton county, Sunfield village.	Midland county, Coleman city.	Midland county, Warren township.
Kent county, Grand Rapids city.	Grand Traverse county, Fife Lake village.	Missaukee county, Norwich township.	Kalkaska county, Kalkaska village.
Kent county, Grand Rapids city.	Ionia county, Portland village.	Missaukee county, Pioneer township.	Missaukee county, Reeder township.
Kent county, Grand Rapids city.	Kent county, Sparta township.	Montcalm county, Day township.	Grand Traverse county, Traverse City.
Kent county, Grand Rapids city.	Mason county, Amber township.	Muskegon county, Montague village.	Muskegon county, Muskegon city.
Kent county, Grand Rapids city.	Missaukee county, Clam Union township.	Muskegon county, Muskegon city.	Washtenaw county, Ann Arbor city.
Kent county, Grand Rapids city.	Muskegon county, Montague village.	Muskegon county, Norton township.	Muskegon county, Muskegon city.
Kent county, Grand Rapids city.	Ottawa county, Blendon township.	Oakland county, (No locality given).	Macomb county, Richmond village.
Kent county, Grand Rapids city.	Ottawa county, Holland township.	Ogemaw county, West Branch city.	Ogemaw county, West Branch township.
Kent county, Grand Rapids city.	Ottawa county, Robinson township.	Oscoda county, Mentor township.	Oscoda county, Clinton township.
Kent county, Grand Rapids city.	Ottawa county, Zeeland city.	Saginaw county, Buena Vista township.	Saginaw county, Saginaw city.
Lapeer county, Lapeer city.	Ingham county, Lansing city.	Saginaw county, Saginaw city.	Saginaw county, Frankenmuth township.
Lenawee county, Woodstock township.	Wayne county, Detroit city.	Saginaw county, Saginaw city.	Tuscola county, Almer township.
Mackinac county, Portage township.	Alger county, Burt township.	St. Clair county, Port Huron city.	Lapeer county, Almont township.

TABLE 40.—Continued.

Spread from:	To:
St. Clair county, Port Huron city.	Macomb county, Richmond township.
St. Clair county, Port Huron city.	St. Clair county, Columbus township.
St. Clair county, Port Huron city.	Tuscola county, Cass City village.
St. Joseph county, Mendon village.	Mecosta county, Austin township.
Van Buren county, Almena township.	Berrien county, Watervliet village.
Van Buren county, Lawrence township.	Van Buren county, Covert township.
Washtenaw county, Chelsea village.	Washtenaw county, Ann Arbor city.
Washtenaw county, Milan village.	Genesee county, Grand Blanc township.
Washtenaw county, Milan village.	Washtenaw county, Ann Arbor city.
Washtenaw county, Milan village.	Washtenaw county, York township.
Wayne county, Detroit city.	Clinton county, St. Johns city.
Wayne county, Detroit city.	Genesee county, Thetford township.
Wayne county, Detroit city.	Jackson county, Jackson city.
Wayne county, Detroit city.	Lapeer county, Dryden township.
Wayne county, Detroit city.	Oakland county, Oakland township.
Wayne county, Detroit city.	Oakland county, Southfield township.
Wayne county, Detroit city.	Presque Isle county, Millersburg village.
Wayne county, Detroit city.	St. Joseph county, Sturgis city.
Wayne county, Detroit city.	Sanilac county, Minden township.
Wayne county, Detroit city.	Tuscola county, Vassar village.
Wayne county, Detroit city.	Washtenaw county, Ann Arbor city.
Wayne county, Trenton village.	Monroe county, Berlin township.
Wayne county, Wyandotte city.	Chippewa county, Sault Ste. Marie city.
Wayne county, Wyandotte city.	Huron county, Port Austin township.
Wayne county, Wyandotte city.	Monroe county, Ida township.
Wexford county, Cadillac city.	Clare county, Farwell village.
From Outside the State to Localities in Michigan.	
Arkansas, (No locality given.)	Van Buren county, South Haven city.
Canada, (No locality given.)	Chippewa county, Sault Ste. Marie city.
Canada, (No locality given.)	Shiawassee county, Durand village.
Dakota, (No locality given.)	Huron county, Sherman township.
District of Columbia, Washington.	Montcalm county, Greenville city.

TABLE 40.—CONCLUDED.

Spread from:	To:	Spread from:	To:
Florida, (No locality given.)	Berrien county Watervliet village.	Ohio, Cleveland.	Shiawassee county, Owosso city.
Florida, (No locality given.)	Clinton county, Riley township.	Ohio, (No locality given.)	Eaton county, Dimondale village.
Illinois, Chicago.	Berrien county, Benton township.	Ohio, (No locality given.)	Huron county, Huron township.
Illinois, Chicago.	Kalamazoo county, Kalamazoo city.	Ohio, Springfield.	Benzie county, Benzonia village.
Illinois, Chicago.	Muskegon county, Muskegon township.	Ohio, Toledo.	Hillsdale county, Hillsdale city.
Illinois, Chicago.	Washtenaw county, Ann Arbor city.	Ohio, Toledo.	Lapeer county, Imlay City village.
Indiana, Gary.	Berrien county, Watervliet village.	Ohio, Toledo.	Monroe county, Bedford township.
Indiana, Gary.	Kalamazoo county, Kalamazoo city.	Ontario, Sault Ste. Marie.	Chippewa county, Sault Ste. Marie city.
Indiana, (No locality given.)	Berrien county, Watervliet township.	Pennsylvania, Pittsburg.	Cass county, Dowagiac city.
Indiana, (No locality given.)	Hillsdale county, Montgomery village.	South Dakota, (No locality given.)	Ottawa county, Holland city.
Kentucky, (No locality given.)	Branch county, Coldwater city.	Texas, (No locality given.)	Oakland county, West Bloomfield township.
Minnesota, Coleraine.	Marquette county, Tilden township.	Texas, (No locality given.)	Oceana county, Shelby village.
Minnesota, (No locality given.)	Osceola county, Rose Lake township.	Wisconsin, Milwaukee.	Houghton county, Elm River township.
Missouri, (No locality given.)	Oceana county, Shelby township.	Wyoming, (No locality given.)	Eaton county, Brookfield township.
Nebraska, (No locality given.)	Tuscola county, Indianfields township.	Wisconsin, Woodville.	Lake county, Chase township.
New York, Buffalo.	Oakland county, Milford village.		

RESTRICTIVE AND PREVENTIVE MEASURES.

Table 41 indicates that, in 1905-7, in a large number of instances, the disinfection of the discharges, and of clothing and other articles soiled by the discharges, of typhoid fever patients, was enforced. This is very gratifying, because it is through the discharges that the disease is spread. This does not, however, include the discharges from patients prior to the recognition of the disease and for some time subsequent to apparent recovery, nor the discharges from ambulatory cases which are seldom, if ever, recognized, all of which are believed to be fruitful sources of the disease.

The disinfection of rooms in which the patients were sick was enforced in sixty-six per cent of the cases. This shows a much greater recognition of the importance of this precautionary measure than was reported in the single year 1905.

Judging by the per cent of cases in which the isolation of the patient was enforced, the necessity for this restrictive measure is quite generally recognized. This is also true, though to a less extent, in respect to the placarding of premises. It is sometimes urged that if proper precautions are taken in the care of typhoid fever patients the isolation of the sick and the placarding of premises are not necessary. To this it should be stated, that inasmuch as strict precautions are not always observed in such cases, and for the further reason that many prominent medical men, in this and other countries, are advocates of the theory of the communicability of typhoid fever directly from patient to nurse, and to others who may come in contact with them, members of the families of those sick, other than those who may be in attendance upon the sick, should be excluded from the sick room, and the public should be warned against visiting the houses, and especially against drinking the water from any wells or making use of any outhouses on the premises where the disease is present.

As indicated in the footnote of Table 41, the boiling of the drinking water, in cases where the water supplies were believed to have been the sources of the typhoid fever, was carried out in less than one-third of the cases. The boiling of suspected water, for drinking and domestic purposes, does not entail much time or labor, and is an absolute safeguard against the communication of typhoid fever through this agency. There is an objection, however, especially in very warm weather, to the drinking of water which has been boiled and thus rendered insipid, but the protection which the boiling affords should more than offset any objection of this nature.

In April 1907, a question relative to the disinfection of privies in outbreaks of typhoid fever was added to the blanks for the Health Officer's Final Report to this Department; and in cases where the reports showed that this restrictive measure had not been carried out a letter was mailed to the health officer in substance as follows:

> Referring to typhoid fever, I beg to call your particular attention to the necessity of disinfecting the privy, where there is one in use, as soon as the first case of typhoid fever on the premises is recognized.
>
> A person coming down with typhoid fever is ailing about a week or ten days before the disease is known to be typhoid fever, and although he may be able to be about the premises, still he is infected

with the disease in its first stages. Probably the discharges from that person (since he did not know what his sickness was) were deposited, without having been first disinfected, in the privy on the premises. If so, they become a menace to the health of the family and a possible source of contamination to the well water. Flies swarming over the contents of the privy may carry the infection of the discharges to the house, where the infection is deposited on table food and conveyed to other members of the family; and surface drainage may convey the infection in the discharges thrown into the privy or buried in the ground to well water.

Therefore the privy should have quicklime spread six inches thick over the contents, as soon as the first case of typhoid fever is recognized on the premises, and thereafter all discharges from the sick person should be thoroughly disinfected before being thrown into the privy or buried in the ground.

TABLE 41—*Restrictive and preventive measures in typhoid fever, in Michigan, in the three years, 1905–1907.*

Restrictive and preventive measures.	Number of cases.	Per cent of all cases.
PLACARDING OF PREMISES:		
Enforced	5,005	[*]64
Neglected, not stated or statements doubtful	2,805	[*]36
ISOLATION OF SICK PERSONS:		
Enforced	5,682	72
Neglected	817	10
Not stated, or statements doubtful	1,391	18
DISCHARGES FROM THE BOWELS AND BLADDER:		
Disinfected	6,064	77
Not disinfected	368	5
Not stated, or statements doubtful	1,458	18
CLOTHING AND OTHER ARTICLES SOILED BY DISCHARGES:		
Disinfected	6,415	81
Not disinfected	136	2
Not stated, or statements doubtful	1,339	17
INFECTED ROOMS:		
Disinfected	5,172	66
Not disinfected	1,038	13
Not stated, or statements doubtful	1,680	21
DRINKING WATER:		
Boiled during the period of sickness	[†]211	38
Not boiled	[†]280	51
Not stated, or statements doubtful	[†]59	11
PROTECTION AGAINST FLIES:		
Houses screened during fly time	[‡]3,665	69
Not screened	[‡]555	11
Not stated, or statements doubtful	[‡]1,082	20

[*] Placarding was not considered necessary in 80 instances, in which the patients were confined in hospitals or pest houses, therefore this number has been deducted from the 7,890 cases reported during the three years, before making these per cents.

[†] These figures represent the number of cases which were definitely traced, or believed to have been due to drinking infected water.

[‡] Of the 7,890 cases of typhoid fever in the three years, 1905-1907, 2,588 occurred in months when there were no flies, consequently no necessity for screening; therefore the 2,588 cases are not included in these figures.

TYPHOID FEVER ON THE GREAT LAKES.

In the fall of 1907, the attention of this Department was called to a serious outbreak of typhoid fever on one of the large steamers plying between Buffalo and Duluth. The history of this outbreak and also a preceding outbreak in 1906 on the same steamer, is recorded by George

C. Whipple, Consulting Engineer, New York, in his recent work on "Typhoid Fever, its Causation, Transmission and Prevention," as follows:

> "An interesting example of what was probably an accidental contamination of water occurred on one of the large passenger steamboats on the Great Lakes plying between Buffalo and Duluth. One of the victims has related the following incident:
>
> "'We left Buffalo on June 29, 1906, and passed Detroit about noon of the 31st. During the night following, about 30 or 40 passengers were taken violently ill with severe intestinal disturbances; and two or three weeks afterwards a number of these came down with typhoid fever, I being among the number. On inquiry I learned from one of the officers that the supply of drinking water, usually taken from the middle of Lake Erie where it is pure and wholesome, had run short, and that the tanks had been filled in the Detroit river at a point not far below Detroit, that is in the path of the city's sewage.'
>
> "The following summer there was another outbreak among the passengers and crew on the same steamer, which resulted in upwards of 70 typhoid cases and at least 5 deaths. Among those who contracted the disease were 5 musicians and 12 chambermaids employed on the boat, and some of the crew. An investigation of this outbreak was made by the Board of Health of Buffalo, which showed that the water in some of the tanks was contaminated, while the toilet rooms and kitchens of the boat were in an insanitary condition. This led to an extensive cleansing of certain parts of the steamer, and to the disinfection of the water supply tanks by the health authorities; and after some delay the vessel was allowed to clear from Buffalo, upon the agreement of the company to supply sterilized water for drinking purposes, and to duly notify the passengers and crew of the possible dangers of the tank water.
>
> "This is probably an exaggerated instance of something that occurs more or less frequently, and well illustrates the risks that one is compelled to run in traveling."

DIPHTHERIA AND CROUP IN MICHIGAN IN 1907 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1907, diphtheria was reported present in 2,101 households, with totals of 2,935 cases and 388 deaths, an average of 1.40 cases and .18 deaths per household.

In 1907, compared with the average for the thirteen years, 1894-1906, the number of cases were 228 less, and the deaths 183 less.

By reference to Table 42, it may be seen that in the fourteen years, 1894-1907, the average number of cases and deaths, the average deaths per 100 cases, and the average death rate per 100,000 of the population, were very much less than the average for the ten preceding years. The reason for this decrease will be considered in connection with Table 50, on a subsequent page of this article.

Going back still further, by reference to Table 43, we find that in the 15 years, 1869-1883, the average death rate was about 58.5 per 100,000 of the population, a rate not equalled in any subsequent year. This high rate was due to the unusual rates for each of the years 1879-1882, the maximum of 145.2 deaths per 100,000 being reached in 1881. In the last year named, active measures for the restriction of diphtheria were begun by the State Department of Health, and the Tables 43 and 44 show a much lower death rate for each year since that time, especially in the last nine years.

TABLE 42—*The prevalence of diphtheria, in Michigan, during the ten years, 1884–1893, and before the use of antitoxin; also a similar statement for the fourteen years, 1894–1907, since the beginning of the general use of antitoxin.*

Years.	Population.*	Reported cases.	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 of the population.
1884	1,853,658	3,915	905	23.1	48.8
1885	1,893,697	4,018	964	24.0	50.9
1886	1,933,735	4,244	982	23.1	50.8
1887	1,973,774	3,382	825	24.4	41.8
1888	2,013,812	2,228	532	23.9	26.4
1889	2,053,851	3,157	683	21.6	33.3
1890	2,093,889	4,206	1,050	25.0	50.1
1891	2,130,827	4,385	1,002	22.9	47.0
1892	2,167,765	4,818	1,099	22.8	50.7
1893	2,204,703	4,736	1,092	23.1	49.5
Averages, 1884–1893	2,031,971	3,909	913	23.4	44.9
1894	2,241,641	3,852	744	19.3	33.2
1895	2,271,531	3,433	708	20.6	31.2
1896	2,301,421	4,013	757	18.9	32.9
1897	2,331,311	4,132	756	18.3	32.4
1898	2,361,201	2,357	477	20.2	20.2
1899	2,391,091	2,154	435	20.2	18.2
1900	2,420,982	2,706	528	19.5	21.8
1901	2,450,872	2,498	493	19.7	20.1
1902	2,475,499	2,993	500	†16.4	20.2
1903	2,502,758	3,670	569	15.5	22.7
1904	2,530,016	3,510	538	15.3	21.3
1905	2,557,275	2,159	465	21.5	18.2
1906	2,584,533	3,648	453	12.4	17.5
1907	2,611,792	2,935	388	13.2	14.9
Averages, 1894–1907	2,430,852	3,147	558	17.7	23.0

* Estimated for intercensal years.

† Exclusive of the cases in the cities of Muskegon and Sault Ste. Marie, from which only the fatal cases were reported in this year.

TABLE 43—*The number of deaths from diphtheria and croup, in Michigan, per 100,000 persons living, in each of the fifteen years, 1869–1883. Compiled from reports to the Secretary of State.*

Years	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	Average, 1869–1883.
Deaths	17.0	20.9	22.5	28.2	29.6	26.2	26.9	34.7	50.6	72.8	110.5	113.9	145.2	102.1	75.7	58.5

GEOGRAPHICAL DISTRIBUTION OF DIPHTHERIA.

Table 44 shows that, as indicated by the number of deaths per 100,000 inhabitants in the seventeen years, 1891-1907, diphtheria was much more prevalent than the average for the entire State (27.1 deaths per 100,000 inhabitants) in the Northeastern and Southeastern Divisions.

The counties in which the death rates from diphtheria were unusually high in the seventeen years, 1891-1907, are:

Roscommon*	with a death rate of	119.6	per 100,000.
Wayne	“ “ “ “ “	57.2	“ “
Alcona	“ “ “ “ “	53.7	“ “
Otsego	“ “ “ “ “	50.3	“ “
Gogebic	“ “ “ “ “	50.2	“ “
Presque Isle	“ “ “ “ “	48.4	“ “
Cheboygan	“ “ “ “ “	44.8	“ “
Bay	“ “ “ “ “	44.4	“ “
Iosco	“ “ “ “ “	44.0	“ “
Midland	“ “ “ “ “	42.4	“ “
Huron	“ “ “ “ “	41.2	“ “
Alpena	“ “ “ “ “	37.1	“ “
Lake	“ “ “ “ “	36.5	“ “
Dickinson	“ “ “ “ “	35.3	“ “
Marquette	“ “ “ “ “	35.3	“ “
Arenac	“ “ “ “ “	34.9	“ “

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* The amazingly high rate in this county was due to a case of so-called sore throat in 1903, of which particulars were given in the annual report of this Department for 1894. The high rates in other counties were due, in the main, to epidemics in one or more of the seventeen years for which the rates are computed.

TABLE 44—*The geographical distribution of diphtheria, in Michigan, in the seventeen years, 1891-1907, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	242,382	366.4	64.4	26.6
Alger county	4,751	2	.5	10.5
Baraga county	4,723	.8	.2	4.2
Chippewa county	18,888	†15	5	26.5
Delta county	23,231	20	4	17.2
Dickinson county	17,002	34	6	35.3
Gogebic county	15,935	42	8	50.2
Houghton county	57,355	81	13	22.7
Iron county	6,967	10	2	28.7
Keweenaw county	3,486	4	.9	25.8
Luce county	3,051	.6	.2	6.6
Mackinac county	7,715	4	.6	7.8
Marquette county	39,687	92	14	35.3
Menominee county	25,136	40	7	27.8
Ontonagon county	6,463	12	1	15.5
Schoolcraft county	7,992	9	2	25.0
NORTHWESTERN DIVISION.	83,991	87	14.8	17.6
Benzie county	9,562	8	.8	8.4
Grand Traverse county	20,485	20	4	19.5
Leelanau county	10,256	15	2	19.5
Manistee county	27,025	25	5	18.5
Wexford county	16,663	19	3	18.0
NORTHERN DIVISION.	73,418	86	17.6	24.0
Antrim county	14,269	6	2	14.0
Charlevoix county	13,565	8	2	14.7
Cheboygan county	15,642	39	7	44.8
Crawford county	3,201	4	.7	21.9
Emmet county	14,152	5	.9	6.4
Kalkaska county	6,620	12	2	30.2
Otsego county	5,969	12	3	50.3
NORTHEASTERN DIVISION.	56,250	107	21.2	37.7
Alcona county	5,585	12	3	53.7
Alpena county	18,893	44	7	37.1
Iosco county	11,369	23	5	44.0
Montmorency county	3,038	5	1	32.9
Ogemaw county	7,267	6	.9	12.4
Oscoda county	1,837	2	.3	16.3
Presque Isle county	8,261	15	4	48.4
WESTERN DIVISION.	269,662	376	69	25.6
Kent county	130,917	221	39	29.8
Lake county	5,476	10	2	36.5
Mason county	19,229	20	4	20.8
Muskegon county	37,327	†63	11	29.5
Newaygo county	18,733	10	2	10.7
Oceana county	17,212	12	3	17.4
Ottawa county	40,768	40	8	19.6
NORTHERN CENTRAL DIVISION.	101,111	115	20.3	20.1
Clare county	8,595	9	2	23.3
Gladwin county	6,637	2	.3	4.5
Isabella county	22,968	23	3	13.1
Mecosta county	20,708	16	3	14.5
Midland county	14,166	37	6	42.4
Missaukee county	8,687	5	1	11.5
Osceola county	17,678	13	3	17.0
Roscommon county	1,672	10	2	119.6

* † These footnotes are below Table 42 on a preceding page.

TABLE 44—Concluded.

Geographical divisions.	Average.			
	Population.*	Cases.	Deaths.	Death rates.
Bay and Eastern Division.	342,402	584	101	29.5
Arenac county	8,607	19	3	34.9
Bay county	63,056	163	28	44.4
Huron county	33,952	71	14	41.2
Lapeer county	28,007	36	5	17.8
Saginaw county	83,756	141	23	27.5
Sanilac county	34,620	42	9	26.0
St. Clair county	54,980	81	15	27.3
Tuscola county	35,424	31	4	11.3
Central Division.	315,140	284	50	15.9
Barry county	22,906	15	3	13.1
Clinton county	25,712	17	4	15.6
Eaton county	31,836	18	4	12.6
Genesee county	41,635	39	7	16.8
Gratiot county	29,694	13	3	10.1
Ingham county	41,559	54	9	21.7
Ionia county	34,871	18	4	11.5
Livingston county	19,594	17	3	15.3
Montcalm county	33,831	20	4	11.8
Shiawassee county	33,502	73	9	26.9
Southwestern Division.	140,486	99	24	17.1
Allegan county	39,108	24	6	15.3
Berrien county	47,852	45	10	20.9
Cass county	20,687	13	3	14.5
Van Buren county	32,839	17	5	15.2
Southern Central Division.	317,543	271	43	13.5
Branch county	26,308	15	4	15.2
Calhoun county	50,281	61	9	17.9
Hillsdale county	29,998	25	3	10.0
Jackson county	47,061	41	9	19.1
Kalamazoo county	45,694	61	6	13.1
Lenawee county	48,772	33	6	12.3
St. Joseph county	24,205	9	1	4.1
Washtenaw county	45,224	26	5	11.1
Southeastern Division.	449,422	1,038	223	49.6
Macomb county	32,783	51	11	33.6
Monroe county	33,101	55	11	33.2
Oakland county	44,186	35	7	15.8
Wayne county	339,352	897	194	57.2

* † These footnotes are below Table 42 on a preceding page.

THE PREVALENCE OF DIPHTHERIA IN URBAN AND RURAL LOCALITIES.

Table 45 indicates that, in 1907, with the exception of groups four and five, diphtheria was most prevalent in the large centers of population and least prevalent in the rural localities.

By Table 45A, it may be seen that, in 1907, the urban localities which showed much higher death rates from diphtheria than the death rate for this disease for the entire State for that year were: Battle Creek, Bay City, Detroit, Grand Rapids, Houghton, Ironwood, Ishpeming, Marquette, Mt. Clemens, Mt. Pleasant, Muskegon, Negaunee, Pontiac, Sault Ste. Marie and Ypsilanti.

The localities, shown in Table 45A, in which the death rates from diphtheria were much lower in 1907 than the rate for the entire State for that year were: Alpena, Holland, Kalamazoo, Lansing, Manistee, Menominee and Port Huron.

The localities, shown in Table 45A, which showed much higher death rates from diphtheria in 1907 than the average for such localities in the years 1904-6 were: Battle Creek, Bay City, Escanaba, Holland, Houghton, Ironwood, Ishpeming, Marquette, Muskegon, Negaunee, Pontiac, Sault Ste. Marie, Traverse City and Ypsilanti.

The localities, shown in Table 45A, which showed much lower death rates from diphtheria in 1907 than the average for such localities in the years 1904-6 were: Calumet township, Detroit, Iron Mountain, Jackson, Kalamazoo, Lansing, Manistee, Monroe, Mt. Pleasant, Port Huron and Saginaw.

There were no deaths from diphtheria in 1907 in Albion, Ann Arbor, Cadillac, Charlotte, Cheboygan, Coldwater, Flint, Grand Haven, Hancock, Hillsdale, Ionia, Laurium, Ludington, Norway, Owosso, Petoskey, St. Joseph and Wyandotte.

TABLE 45—*The prevalence of diphtheria in urban and rural localities, in Michigan, in 1907.*

Localities—grouped according to density of population.	Population.*	Health jurisdictions.			Cases.	Deaths.	Death rates per 100,000 of the population.
			Infected.				
		Total.	Number.	Per cent of all jurisdictions.			
Cities over 50,000	451,507	2	2	100	934	100	22.1
Cities from 25,000 to 50,000	149,577	4	4	100	190	23	15.4
Cities from 10,000 to 25,000 and Calumet township (18,253)	255,174	17	16	94	341	49	19.2
Cities and villages from 5,000 to 10,000	175,993	26	19	73	137	17	9.7
Cities and villages under 5,000†	361,839	332	65	20	262	38	10.5
Total urban	1,394,090	381	106	28	1,864	227	16.3
Balance of localities—principally townships‡	1,217,702	1,264	280	22	1,071	161	13.2

* This footnote is below Table 42 on a preceding page.

† Exclusive of forty-two villages, for which the population in 1907 cannot be correctly estimated.

‡ Includes the forty-two villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

TABLE 45A.—*The prevalence of diphtheria in 1907, and preceding years, in each of the principal localities included in the first four groups in Table 45.*

Localities.	1907.				Average, 1904-1906.			
	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.
Adrian	11,450	†	2	17.5	10,937	16	2	18.3
Albion	5,261	1	0	....	5,049	3	0	....
Alpena	12,849	2	1	7.8	12,550	4	.7	5.6
Ann Arbor	14,667	7	0	....	14,619	10	1	6.8
Battle Creek	24,951	95	6	24.0	23,126	48	4	17.3
Bay City	40,562	22	10	24.7	36,282	‡27	‡7	19.3
Benton Harbor	6,807	7	1	14.7	6,737	14	1	14.8
Cadillac	7,565	3	0	....	7,117	17	3	42.2
Calumet township	18,253	11	3	16.4	17,518	20	6	34.3
Charlotte	5,202	0	0	....	4,885	1	0	....
Cheboygan	6,911	0	0	....	6,790	4	.3	4.4
Coldwater	6,232	0	0	....	6,227	2	.3	4.8
Detroit	349,674	631	71	20.3	328,114	§913	116	35.4
Escanaba	12,260	27	2	16.3	11,485	6	1	8.7
Flint	16,220	0	0	....	15,329	28	5	32.6
Grand Haven	5,611	2	0	....	5,363	2	0	....
Grand Rapids	101,833	303	29	28.5	97,756	340	34	34.8
Hancock	7,527	0	0	....	6,534	†	3	45.9
Hillsdale	5,303	1	0	....	4,974	0	0	....
Holland	9,848	8	1	10.2	9,260	3	.7	7.6
Houghton	5,086	1	1	19.7	4,592	.7	.3	6.5
Ionia	5,232	3	0	....	5,225	1	.3	5.7
Iron Mountain	8,092	8	1	12.4	8,421	6	2	23.8
Ironwood	10,255	†	8	78.0	10,098	†	5	49.5
Ishpeming	10,399	40	5	48.1	11,215	14	3	26.7
Jackson	25,390	29	4	15.8	25,330	46	9	35.5
Kalamazoo	33,816	39	1	3.0	31,127	72	6	19.3
Lansing	23,119	11	1	4.3	21,224	14	2	9.4
Laurium	9,161	0	0	....	8,156	.7	.3	3.7
Ludington	7,329	7	0	....	7,282	21	4	54.9
Manistee	11,544	9	1	8.7	12,320	26	4	32.5
Marquette	11,120	27	4	36.0	10,817	15	1	9.2
Menominee	9,805	2	1	10.2	10,666	4	1	9.4
Monroe	6,942	1	1	14.4	6,399	29	2	31.3
Mt. Clemens	7,507	24	4	53.3	7,241	24	4	55.2
Mt. Pleasant	5,101	33	1	19.6	4,690	30	2	42.6
Muskegon	20,956	57	5	23.9	20,917	31	3	14.3
Negaunee	6,694	10	2	29.9	6,763	5	0	....
Norway	5,385	3	0	....	5,038	18	1	19.8
Owosso	9,482	10	0	....	9,257	4	0	....
Petoskey	5,112	9	0	....	5,161	4	.3	5.8
Pontiac	11,720	†	3	25.6	11,163	†	1	9.0
Port Huron	20,681	5	1	4.8	20,246	70	9	44.5
Saginaw	49,809	100	8	16.1	47,676	116	15	31.5
St. Joseph	5,447	0	0	....	5,364	3	.7	13.0
Sault Ste. Marie	12,120	11	5	41.3	11,668	8	.7	6.0
Traverse City	12,610	26	2	15.9	11,695	11	.3	2.6
Wyandotte	5,607	0	0	....	5,486	†	2	36.5
Ypsilanti	7,744	†	4	51.7	7,639	5	0	....

* Estimated for intercensal years.

† Fatal cases only reported.

‡ Does not include West Bay City for 1904, which was consolidated with Bay City in 1905.

§ Average for two years only.

THE REPORTED SOURCES OF CONTAGIUM IN DIPHTHERIA.

Table 46 indicates that the two principal ways in which diphtheria is spread are:

1. By infection from outside health jurisdictions.
2. By infection from a recent previous case in the same household or locality.

The change in the method of studying diphtheria, by *households* instead of *outbreaks,* has resulted in a very decided change in the order and importance of the two first items in Table 46 as sources of contagium in diphtheria, as may be seen by reference to the corresponding table, and accompanying text, in the annual report of this Department for 1906.

The fact that over fifty-six per cent of the cases of diphtheria in 1907, in which a source was given, were due to infection from outside jurisdictions, is a striking example of the lack of, or imperfection, in many instances, of the local efforts for the restriction of the disease.

Were all cases of diphtheria promptly and properly isolated, and the isolation continued until the danger of infecting others was at an end, the spread of the disease from one locality to another would be a rare occurrence.

The places from which and to which diphtheria was spread in 1906 are shown in Table 47.

In the past, very many cases of diphtheria have been reported as due to exposure to persons suffering from sore throat, and other throat troubles, which, in reality, were cases of diphtheria, of a more or less mild character.

Another, and what is generally believed to be a fruitful source of contagium in outbreaks of diphtheria, is the contact of well persons with those recently recovered from the disease, but in the throats of whom the bacilli are still present.

TABLE 46.—*The reported sources of contagium in diphtheria, in Michigan, in the two years, 1906-1907, as indicated by the number and per cent of instances in which each of the given sources was responsible for the introduction of the disease into a household.*

Sources.	Number of instances.	Per cent of all instances in which a source was given.
Outside jurisdiction	195	56.2
Traced to former cases in same locality	130	37.5
At school	10	2.9
Infected premises, clothing, etc.	6	1.7
Insanitary conditions	3	.9
Infected by animals	2	.6
Contaminated water	1	.3
Not stated, or statements doubtful	4,396	*92.7

* Per cent of all households in which diphtheria occurred.

TABLE 47.—*Localities from which and to which diphtheria was spread, during the year 1907.*

Spread from:	To:	Spread from:	To:
Alcona county, Curtis township.	Alcona county, Harrisville village.	Isabella county, Mt. Pleasant city.	Isabella county, Union township.
Alpena county, Alpena city.	Alcona county, Hayes township.	Isabella county, Shepherd village.	Shiawassee county, Fairfield township.
Bay county, Fraser township.	Bay county, Mt. Forest township.	Jackson county, Blackman township.	Jackson county, Jackson city.
Benzie county, (No locality given.)	Saginaw county, Lakefield township.	Jackson county, Jackson city.	Ingham county, Ingham township.
Charlevoix county, Boyne City village.	Charlevoix county, Eveline township.	Kalamazoo county, Kalamazoo city.	Allegan county, Ganges township.
Charlevoix county, Hayes township.	Charlevoix county, Charlevoix city.	Kalkaska county, Rapid River township.	Delta county, Baldwin township.
Charlevoix county, Melrose township.	Charlevoix county, Boyne Falls village.	Kent county, Grand Rapids city.	Kent county, Ada township.
Chippewa county, Raber township.	Chippewa county, Detour township.	Kent county, Grand Rapids city.	Kent county, Caledonia township.
Grand Traverse county, Traverse City.	Leelanau county, Leland township.	Kent county, Grand Rapids city.	Kent county, Cascade township.
Grand Traverse county, Traverse City.	Gratiot county, Wheeler township.	Kent county, Grand Rapids city.	Kent county, Grand Rapids township.
Grand Traverse county, Traverse City.	Grand Traverse county, Whitewater township.	Kent county, Grand Rapids city.	Kent county, Plainfield township.
Houghton county, Adams township.	Ontonagon county, Rockland township.	Kent county, Sparta township.	Kent county, Tyrone township.
Ionia county, Ionia township.	Ionia county, Ionia city.	Kent county, Grand Rapids city.	Muskegon county, Ravenna township.
Ionia county, Orange township.	Ionia county, Portland township.	Kent county, Grand Rapids city.	Ottawa county. Olive township.
Isabella county, Mt. Pleasant city.	Isabella county, Chippewa township.	Kent county, Grand Rapids city.	Ottawa county, Zeeland city.
Isabella county, Mt. Pleasant city.	Isabella county, Denver township.	Lapeer county, Lapeer city.	Tuscola county, Koylton township.

TABLE 47.—CONTINUED.

Spread from:	To:	Spread from:	To:
Leelanau county, Centerville township.	Leelanau county, Leland township.	Oakland county, Royal Oak township.	Oakland county, Royal Oak village.
Leelanau county, Suttons Bay township.	Leelanau county, Leland township.	Oceana county, Hart village.	Oceana county, Hart township.
Lenawee county, Morenci village.	Lenawee county, Medina township.	Ontonagon county, Greenland township.	Ontonagon, county, Rockland township.
Luce county, (No locality given.)	Chippewa county, Dafter township.	Ontonagon county, Rockland township.	Ontonagon county, Greenland township.
Macomb county, Mt. Clemens city.	Macomb county, Clinton township.	Otsego county, Elmira township.	Antrim county, Star township.
Manistee county, Onekama village.	Manistee county, Onekama township.	Saginaw county, Saginaw city.	Oscoda county, Big Creek township.
Marquette county, Champion township.	Ontonagon county, Rockland township.	St. Clair county, Port Huron city.	Ogemaw county, Klacking township.
Mason county, (No locality given.)	Oceana county, Colfax township.	St. Clair county, Port Huron city.	St. Clair county, St. Clair township.
Menominee county, Spaulding township.	Menominee county, Nadeau township.	Shiawassee county, Owosso city.	Lapeer county, Rich township.
Midland county, Jerome township.	Midland county, Lincoln township.	Shiawassee county, Owosso city.	Gratiot county, Wheeler township.
Monroe county, Monroe city.	Monroe county, LaSalle township.	Washtenaw county, Saline township.	Washtenaw county, Ann Arbor city.
Muskegon county, Muskegon city.	Muskegon county, Muskegon township.	Wayne county, Detroit city.	Lapeer county, Almont village.
Muskegon county, Muskegon city.	Muskegon county, Norton township.	Wayne county, Detroit city.	Macomb county, New Baltimore village.
Oakland county, Pontiac city.	Oalkand county, Waterford township.	Wayne county, Detroit city.	Monroe county, Ash township.
Oakland county, Rochester village.	Lapeer county, Oregon township.	Wayne county, Detroit city.	St. Clair county, St. Clair township.

TABLE 47.—CONCLUDED.

Spread from:	To:
Wayne county, Detroit city.	Wayne county, St.Clair Heights village.
FROM OUTSIDE THE STATE TO LOCALITIES IN MICHIGAN.	
Alabama, (No locality given.)	Van Buren county, South Haven township.
Illinois, Chicago.	Berrien county, Benton Harbor city.
Illinois, Chicago.	Newaygo county, Sheridan township.
Illinois, Chicago.	Van Buren county, South Haven city.
Ohio, Toledo.	Monroe county, Bedford township.
Ohio, Toledo.	Monroe county, Erie township.
Minnesota, Duluth.	Gogebic county, Bessemer city.
Wisconsin, Green Bay.	Menominee county, Menominee city.
Wisconsin, Milwaukee.	Manistee county, Manistee city.

RESTRICTIVE AND PREVENTIVE MEASURES.

By reference to Table 48, it may be seen that, of the total number of reports in which a definite statement was made relative to the restrictive and preventive measures of isolation and disinfection in households in which diphtheria occurred, in 1907, a large portion of the reports showed that the above measures had been enforced. One result of these restrictive and preventive measures is shown in the table, viz., the large number of households in which the disease was restricted to the first case.

It is believed that a very much better showing could be made relative to the results of the restrictive measures in diphtheria, as shown in Tables 48 to 51, if, in every case, the isolation of the patient was continued, even after apparent complete recovery, until it was determined by repeated bacteriological tests, that the throat of such person was free from the diphtheria bacillus. This applies, with equal force, to those persons who have been thoroughly exposed to the disease.

In the pamphlet on the "Restriction and Prevention of Diphtheria," published by this Department, the statement is made that, inasmuch as the duration of infectiousness in diphtheria has been proved to be at least three weeks, three weeks should be the shortest period of isolation after apparent complete recovery, unless bacteriological tests indicate the absence of the Löffler Bacillus.

The great difficulty in the way of determining when isolation in diphtheria outbreaks may be discontinued with safety is the absence, except in the case of three or four of the large cities, of facilities for making the necessary bacteriological tests. For this reason, the health officer is often placed in a difficult position, particularly where recovery takes place in a few days. As the State Laboratory will be in shape to take care of these tests from and after January, 1908, the determination of the proper time at which to raise the quarantine in cases of diphtheria should not be a difficult matter in the future years.

TABLE 48.—*Restrictive and preventative measures in diphtheria, in Michigan, in the two years, 1906-1907.*

	Number of households.	Per cent.
PLACARDING, ISOLATION AND DISINFECTION:		
Enforced	4,153	88
Neglected	234	5
Not stated, or statements doubtful	356	7
Instances in which the disease was restricted to the first case in a household	3,808	80

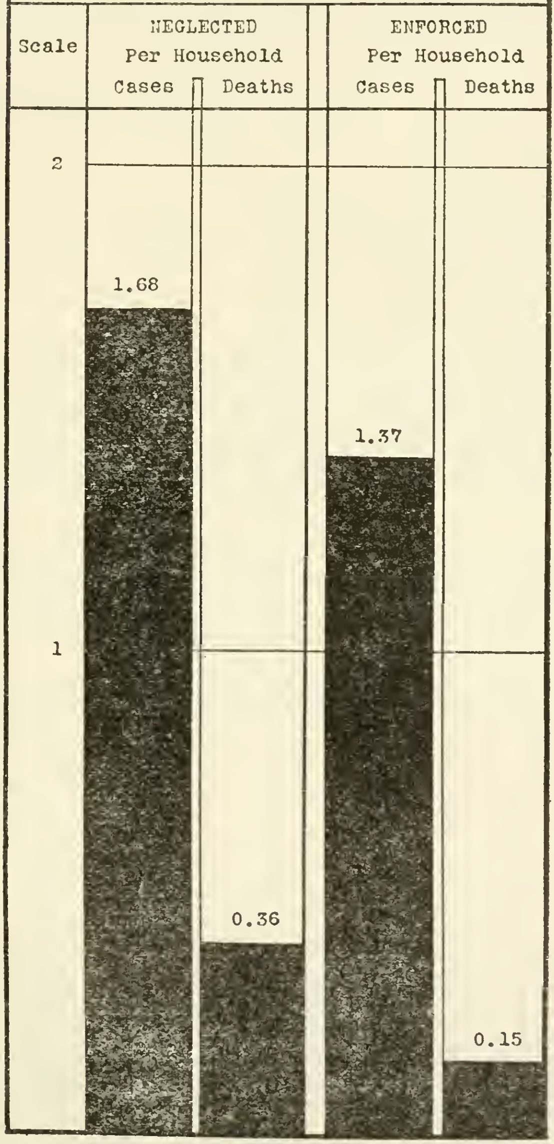
Table 49 and accompanying diagram are here printed for the second time. They are somewhat similar in form to tables and accompanying diagrams in the annual reports of this Department ending with 1904, but the figures now relate to *households* instead of *outbreaks*. The showing made, in 1907, in those instances in which the restrictive and preventive measures of placarding, isolation and disinfection were enforced, is encouraging, particularly in the case of the average number of deaths per household.

TABLE 49.—*Showing the total number of households in which diphtheria was present during the two years, 1906-1907; and the total and average number of cases and deaths in each household in which the restrictive measures were enforced or neglected.*

	Total number of households, 4,743.		Restrictive measures enforced in 4,153 households.		Restrictive measures neglected in 234 households.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals	6,583	841	5,681	633	393	84
Average number per household	1.39	.18	1.37	.15	1.68	.36

DIPHTHERIA RESTRICTED BY ISOLATION AND DISINFECTION.

Average numbers of cases and deaths per household in households in which restrictive measures were Neglected and in households in which restrictive measures were Enforced during the two years, 1906-1907.



[Plate 1286.]

By Table 50, it may be seen that, in 1907, the fatality (deaths per 100 cases) from diphtheria in those households in which the antitoxin treatment was used was fifty-six per cent less than in those households where it was not used.

The decrease in the death rate from diphtheria since 1894, when the general use of antitoxin began, may be seen by reference to Table 42, on a preceding page. It will be noted that, in 1907, the deaths per 100,000 of the population were smaller than at any time since the disease has been studied by this Department.

TABLE 50.—*The antitoxin treatment of persons sick from diphtheria, in Michigan, in the two years, 1906-1907.*

	Number of households.	Number of cases.	Number of deaths.	Deaths per 100 cases.
All outbreaks of diphtheria	4,743	6,583	841	12.8
Outbreaks in which antitoxin was administered to each sick person in a household*	2,698	3,717	373	10.0
Outbreaks in which antitoxin was not administered to the sick	280	402	92	22.9

* There were also 158 households in which 553 cases and 83 deaths occurred, but in which only a portion of the sick persons were treated with antitoxin, and as the reports did not show how many of the 83 fatal cases were included in the 292 cases treated, the 158 households, and the cases and deaths which occurred in them, could not be used in making comparison relative to the fatility from diphtheria in households in which antitoxin was and was not used.

The immunizing property of antitoxin is strikingly shown by Table 51. It should be stated, however, that of those exposed persons who were treated with antitoxin and who subsequently developed diphtheria, many of them had the disease in a very mild form.

TABLE 51.—*The number and per cent of persons exposed to diphtheria, who were treated with antitoxin, and who were subsequently taken sick with the disease, in each of the years, 1902-1907.*

Years.	Exposed persons treated with antitoxin.		
	Number.	Taken sick.	Per cent.
1902	495	16	3.23
1903	585	12	2.05
1904	612	24	3.92
1905	1,312	50	3.81
1906	2,190	61	2.79
1907	1,896	83	4.38
Average	1,182	41	3.47

WHOOPING-COUGH IN MICHIGAN IN 1907 AND PRECEDING YEARS.

During the year ending December 31, 1907, whooping-cough was reported present in 528 households, with a total of 872 cases, including 214 deaths. As the health officers of many localities did not report the cases of whooping-cough which occurred in their localities, it is impossible to determine, with any degree of accuracy, the total number of households infected or the number of cases which occurred in such households.

TABLE 52.—*The general prevalence of whooping-cough, in Michigan, during the twenty two years, 1886-1907.*

Years.	Population.*	Reported cases.†	Reported deaths.	Deaths per 100 cases.‡	Deaths per 100,000 of the population.
1886	1,933,735	2,642	62	2.3	3.2
1887	1,973,774	2,267	59	2.6	3.0
1888	2,013,812	2,502	49	2.0	2.4
1889	2,053,851	2,694	41	1.5	2.0
1890	2,093,889	983	20	2.0	1.0
1891	2,130,827	2,360	101	4.3	4.7
1892	2,167,765	3,188	77	2.4	3.6
1893	2,204,703	4,047	134	3.3	6.1
1894	2,241,641	4,555	123	2.7	5.5
1895	2,271,531	4,284	109	2.5	4.8
1896	2,301,421	5,466	91	1.7	4.0
1897	2,331,311	3,978	72	1.8	3.1
1898	2,361,201	5,300	267	5.0	11.3
1899	2,391,091	6,509	216	3.3	9.0
1900	2,420,982	3,397	177	5.2	7.3
1901	2,450,872	2,955	118	4.0	4.8
1902	2,475,499	3,534	222	6.3	8.9
1903	2,502,758	4,172	361	8.7	14.4
1904	2,530,016	1,779	141	7.9	5.6
1905	2,557,275	1,196	119	9.9	4.7
1906	2,584,533	1,364	392	28.7	15.2
1907	2,611,792	872	214	24.5	8.2
Averages per year	2,300,195	3,184	144	4.5	6.3

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* Estimated for intercensal years.

† From many localities only the fatal cases were reported during many of the years.

‡ For the reason that, in many instances, only the fatal cases were reported, these fatality rates are probably inaccurate.

In 1907, compared with the preceding year, there was a large decrease in the number of reported cases of whooping-cough, and the death rate per 100,000 inhabitants was very much lower.

In 1907, compared with the average for the twenty-one years, 1886-1906, the number of reported cases of whooping-cough was seventy-four per cent less, while the death rate per 100,000 inhabitants was thirty-four per cent greater, as may be seen by reference to Tables 52 and 53.

The fatality rate (deaths per 100 cases) for whooping-cough in 1907 was about five times greater than the average for the twenty-one years preceding, and very much greater than the fatality rate for any year, save 1906, shown in Table 53.

In studying the fatality rates for whooping-cough, particularly in recent years, the fact should be borne in mind that prior to 1898, not all the deaths were reported, and that while the deaths from whooping-cough are now fully reported, a large number of cases are not reported, making the fatality in recent years much too high.

Table 53 gives the death rates for whooping-cough, as compiled by the Secretary of State, prior to the commencement of the compilation of this disease by the State Health Department. Comparing the death rates prior to 1886 with those since that time, it will be seen that, as a rule, the former were much greater, probably due to the different methods in use in the two departments in the classification of deaths from whooping-cough when complicated with or followed by other diseases induced by it.

TABLE 53.—*The number of deaths from whooping-cough, in Michigan, per 100,000 persons living, in each of the seventeen years, 1869–1885. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Years	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Deaths	13.9	10.1	5.5	15.1	15.6	11.2	7.2	12.4	8.7	8.5	10.2
Years	1880.	1881.	1882.	1883.	1884.	1885.	Average. 1869–1885.				
Deaths	16.1	8.4	5.0	5.2	8.8	7.4	10.0				

GEOGRAPHICAL DISTRIBUTION OF WHOOPING-COUGH.

Table 54 indicates that in the ten years, 1898-1907, compared with the average death rate for the entire State for the same period (8.9 per 100,000), whooping-cough was much more prevalent than the average in the Upper Peninsular division, and slightly more prevalent than the average in the Northern, Northeastern, Northern Central, Bay and Eastern and Southeastern divisions.

The counties in which whooping-cough was unusually prevalent during the nine years, 1898-1906, are: Alger, Houghton, Iron, Dickinson, Delta, Menominee, Cheboygan, Marquette, Bay, Alpena, Otsego, Baraga, Midland and Mason.

TABLE 54.—*The geographical distribution of whooping-cough, in Michigan, in the ten years, 1898–1907, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	266,569	659	47.5	17.8
Alger county	6,192	8	2	32.3
Baraga county	5,120	1	.7	13.7
Chippewa county	21,429	101	2	9.3
Delta county	26,049	74	5	19.2
Dickinson county	18,152	20	4	22.0
Gogebic county	16,805	27	2	11.9
Houghton county	66,856	165	15	22.4
Iron county	8,759	15	2	22.8
Keweenaw county	4,015	3	.2	5.0
Luce county	3,461	3	.4	11.6
Mackinac county	7,857	6	.4	5.1
Marquette county	40,167	136	7	17.4
Menominee county	26,249	36	5	19.0
Ontonagon county	6,909	7	.8	11.6
Schoolcraft county	8,549	57	1	11.7
NORTHWESTERN DIVISION.	90,387	87	6.8	7.5
Benzie county	10,770	7	.9	8.4
Grand Traverse county	22,728	34	2	8.8
Leelanau county	10,867	4	1	9.2
Manistee county	27,453	32	2	7.3
Wexford county	18,569	10	.9	4.8
NORTHERN DIVISION.	81,887	120	8.8	10.7
Antrim county	15,554	33	2	12.9
Charlevoix county	15,305	9	.9	5.9
Cheboygan county	16,842	16	3	17.8
Crawford county	3,472	5	.3	8.6
Emmet county	16,678	29	1	6.0
Kalkaska county	7,275	11	.6	8.2
Otsego county	6,761	17	1	14.8
NORTHEASTERN DIVISION.	59,073	83	6.5	11.0
Alcona county	5,633	2	.1	1.8
Alpena county	19,673	20	3	15.2
Iosco county	10,222	10	1	9.8
Montmorency county	3,486	14	.4	11.5
Ogemaw county	8,301	32	1	12.0
Oscoda county	1,808	2	0	....
Presque Isle county	9,950	3	1	10.0
WESTERN DIVISION.	276,457	243	17.7	6.4
Kent county	137,004	138	6	4.4
Lake county	5,038	6	0	....
Mason county	19,757	24	3	15.2
Muskegon county	36,725	19	3	8.2
Newaygo county	18,183	11	1	5.5
Oceana county	17,589	22	.7	4.0
Ottawa county	42,161	23	4	9.5
NORTHERN CENTRAL DIVISION.	106,429	200	9.6	9.0
Clare county	8,958	20	.8	8.9
Gladwin county	7,813	18	1	12.8
Isabella county	24,038	29	2	8.3
Mecosta county	20,598	31	2	9.7
Midland county	14,909	64	2	13.4
Missaukee county	9,937	10	.6	6.0
Osceola county	18,539	23	1	5.4
Roscommon county	1,637	5	.2	12.2

* † These footnotes are below Table 52 on a preceding page.

TABLE 54.—CONCLUDED.

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
BAY AND EASTERN DIVISION.	347,237	352	33	9.5
Arenac county	9,783	9	1	10.2
Bay county	64,013	58	10	15.6
Huron county	35,164	66	3	8.5
Lapeer county	27,400	39	2	7.3
Saginaw county	84,366	43	6	7.1
Sanilac county	35,007	56	3	8.6
St. Clair county	55,431	45	5	9.0
Tuscola county	36,073	36	3	8.3
CENTRAL DIVISION.	316,391	560	21.6	6.8
Barry county	22,390	82	2	8.9
Clinton county	25,356	31	2	7.9
Eaton county	31,303	148	2	6.4
Genesee county	42,471	26	3	7.1
Gratiot county	30,144	21	2	6.6
Ingham county	42,900	45	2	4.7
Ionia county	35,090	78	2	5.7
Livingston county	19,013	46	.6	3.2
Montcalm county	33,731	43	4	11.9
Shiawassee county	33,983	40	2	5.9
SOUTHWESTERN DIVISION.	143,154	176	11	7.7
Allegan county	39,034	36	2	5.1
Berrien county	49,595	63	5	10.1
Cass county	20,394	29	1	4.9
Van Buren county	34,131	48	3	8.8
SOUTHERN CENTRAL DIVISION.	323,415	429	21.8	6.7
Branch county	26,369	32	2	7.6
Calhoun county	52,394	89	5	9.5
Hillsdale county	29,840	52	.9	3.0
Jackson county	47,453	85	5	10.5
Kalamazoo county	48,302	61	4	8.3
Lenawee county	48,938	45	2	4.1
St. Joseph county	23,606	23	.9	3.8
Washtenaw county	46,513	42	2	4.3
SOUTHEASTERN DIVISION.	483,707	205	45	9.3
Macomb county	33,098	39	4	12.1
Monroe county	33,146	50	3	9.1
Oakland county	45,359	28	2	4.4
Wayne county	372,104	88	36	9.7

*† These footnotes are below Table 52 on a preceding page.

TABLE 55.—*The reported sources of contagium in whooping-cough, in Michigan, in the two years, 1906–1907, as indicated by the number and per cent of instances in which each of the given sources was responsible for the introduction of the disease into a household.*

Source.	Number of instances.	Per cent of all instances in which a source was given.
Outside jurisdictions	79	56.8
Traced to former cases in same locality	58	41.7
Contracted at school	2	1.4
Not stated, or statements doubtful	1,159	*89.3

* Per cent of all households in which whooping-cough occurred.

TABLE 56.—*Localities from which and to which whooping-cough was spread, during the year 1907.*

Spread from:	To:	Spread from:	To:
Antrim County, Elk Rapids Village.	Antrim County, Milton Township.	Muskegon County, Fruitport Township.	Muskegon County, Fruitport Village.
Antrim County, Elk Rapids Village.	Grand Traverse County, Peninsula Township.	Saginaw County, Saginaw City.	Bay County, Mt. Forest Township.
Berrien County, Benton Harbor City.	Calhoun County, Albion City.	Saginaw County, Saginaw City.	Oakland County, Springfield Township.
Branch County, Mattison Township.	Branch County, Bronson Village.	Shiawassee County, Owosso City.	Clinton County, Elsie Village.
Clinton County, St. Johns City.	Clinton County, DeWitt Township.	Van Buren County, South Haven City.	Charlevoix County, St. James township.
Delta County, Escanaba City.	Delta County, Maple Ridge Township.	Van Buren County, South Haven City.	Van Buren County, Breedsville Village.
Eaton County, Grand Ledge City.	Barry County, Woodland Township.	Wayne County, Detroit City,	Muskegon County, Muskegon Heights City.
Jackson County, Jackson City.	Branch County, Coldwater City.	FROM OUTSIDE THE STATE TO LOCALITIES IN MICHIGAN.	
Lenawee County, Addison Village.	Lenawee County, Morenci Village.	Spread from:	To:
Muskegon County, Muskegon City.	Antrim County. Star Township.	Ohio, Toledo.	Monroe County, Bedford Township.

REPORTED SOURCES OF CONTAGIUM.

Of the total number of reports of whooping-cough in 1907, less than eleven per cent gave a definite source of contagium.

As shown in Table 55, in 1907, fifty-seven per cent of the outbreaks in which a source was given were due to infection from outside jurisdictions, and forty-two per cent to infection from former cases in the same localities.

The places from which and to which whooping-cough was spread in 1907 are shown in Table 56.

RESTRICTIVE AND PREVENTIVE MEASURES.

Table 57 indicates that in but twenty-one per cent of the outbreaks of whooping-cough in 1907 was there any attempt made to restrict the disease, and this condition will continue until the dangerous character of the disease is fully and universally recognized.

TABLE 57.—*Restrictive and preventive measures in whooping-cough, in Michigan, in the two years, 1906–1907.*

Restrictive and preventive measures.	Number of households.	Per cent.
PLACARDING, ISOLATION AND DISINFECTION:		
Enforced	277	21
Neglected	616	48
Not stated, or statements doubtful	405	31

SCARLET FEVER IN MICHIGAN IN 1907 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1907, scarlet fever was reported in 1,661 households in the State, with an aggregate of 2,514 cases, including 167 deaths.

In 1907, compared with the preceding year, there were 552 cases and 58 deaths less.

TABLE 58.—*The prevalence of scarlet fever, in Michigan, during the twenty-four years, 1884-1907.*

Years.	Population.*	Reported cases.†	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 of the population.
1884	1,853,658	2,476	230	9.3	12.4
1885	1,893,697	2,750	187	6.8	9.9
1886	1,933,735	3,046	275	9.0	14.2
1887	1,973,774	3,400	314	9.2	15.9
1888	2,013,812	2,989	200	6.7	9.9
1889	2,053,851	3,535	166	4.7	8.1
1890	2,093,889	3,835	162	4.2	7.7
1891	2,130,827	6,212	286	4.6	13.4
1892	2,167,765	7,075	487	6.9	22.5
1893	2,204,703	6,065	415	6.8	18.8
1894	2,241,641	5,500	203	3.7	9.1
1895	2,271,531	3,908	125	3.2	5.5
1896	2,301,421	2,646	81	3.1	3.5
1897	2,331,311	2,482	115	4.6	4.9
1898	2,361,201	2,409	100	4.2	4.2
1899	2,391,091	4,345	171	3.9	7.2
1900	2,420,982	6,734	306	4.5	12.6
1901	2,450,872	7,726	398	3.9	12.2
1902	2,475,499	6,582	248	3.8	10.0
1903	2,502,758	5,353	212	4.0	8.5
1904	2,530,016	4,088	228	5.6	9.0
1905	2,557,275	2,286	125	5.5	4.9
1906	2,584,533	3,066	255	7.3	8.7
1907	2,611,792	2,514	167	6.6	6.4
Averages per year	2,264,651	4,209	222	5.3	9.8

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* Estimated for intercensal years.

† Only the fatal cases were reported from Laurium village, in recent years, so that the figures in this column do not accurately represent the number of cases which occurred.

In 1907, compared with the average for twenty-four years, shown in Table 58, the number of cases and deaths and the death rate per 100,000 of the population were considerably less, and the fatality (deaths per 100 cases) slightly more.

A comparison of the death rates in Tables 58 and 59 shows that, from 1870 to 1883, inclusive, the death rates from scarlet fever were much higher than in any year since that time, the highest rates being in the years prior to the establishment of the State Board of Health.

TABLE 59.—*The number of deaths from scarlet fever, in Michigan, per 100,000 persons living in each of the fifteen years, 1869–1883. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Years	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	Average, 1869–1883.
Deaths	22.1	72.0	56.6	44.3	43.9	32.2	30.0	27.4	26.9	27.7	26.3	22.7	22.8	34.3	37.9	35.1

GEOGRAPHICAL DISTRIBUTION OF SCARLET FEVER.

Table 60 indicates that, compared with the average for the entire State for the fifteen years, 1892-1907 (9.3 deaths per 100,000 inhabitants), scarlet fever was much more prevalent than the average, in the Upper Peninsular and Southeastern divisions.

The counties in which scarlet fever was unusually prevalent in the sixteen years, 1892-1907, placed in the order of greatest death rates, are:

Houghton	with a death rate of	32.4	per 100,000
Oscoda	" " " " "	27.4	" "
Mackinac	" " " " "	26.1	" "
Keweenaw	" " " " "	25.5	" "
Gogebic	" " " " "	25.0	" "
Missaukee	" " " " "	22.5	" "
Lake	" " " " "	18.5	" "
Wexford	" " " " "	17.7	" "
Wayne	" " " " "	16.6	" "
Otsego	" " " " "	16.5	" "
Alpena	" " " " "	15.7	" "
Chippewa	" " " " "	15.6	" "
Macomb	" " " " "	15.2	" "
Marquette	" " " " "	15.1	" "
Ontonagon	" " " " "	15.1	" "
Antrim	" " " " "	13.8	" "

TABLE 60.—*The geographical distribution of scarlet fever, in Michigan, in the sixteen years. 1892–1907, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	246,168	588	43.6	17.7
Alger county	4,968	6	.1	2.0
Baraga county	4,821	3	0	....
Chippewa county	19,275	36	3	15.6
Delta county	23,672	38	2	8.4
Dickinson county	17,068	34	2	11.7
Gogebic county	16,026	40	4	25.0
Houghton county	58,647	185	19	32.4
Iron county	7,641	8	.4	5.2
Keweenaw county	3,532	6	.9	25.5
Luce county	3,073	1	.2	6.5
Mackinac county	7,677	15	2	26.1
Marquette county	39,707	158	6	15.1
Menominee county	25,339	28	2	7.9
Ontonagon county	6,624	15	1	15.1
Schoolcraft county	8,098	15	1	12.3
NORTHWESTERN DIVISION.	85,211	178	8.3	9.7
Benzie county	9,822	33	1	10.2
Grand Traverse county	20,900	51	2	9.6
Leelanau county	10,390	8	.3	2.9
Manistee county	27,127	49	2	7.4
Wexford county	16,972	37	3	17.7
NORTHERN DIVISION.	74,532	160	7.9	10.6
Antrim county	14,478	30	2	13.8
Charlevoix county	13,779	31	.9	6.5
Cheboygan county	15,837	31	2	12.6
Crawford county	3,205	9	.4	12.5
Emmet county	14,476	29	.9	6.2
Kalkaska county	6,697	19	.7	10.5
Otsego county	6,060	11	1	16.5
NORTHEASTERN DIVISION.	56,486	101	6.3	11.2
Alcona county	5,581	10	.4	7.2
Alpena county	19,058	29	3	15.7
Iosco county	11,075	20	1	9.0
Montmorency county	3,126	12	.4	12.8
Ogemaw county	7,349	21	.6	8.2
Oscoda county	1,823	4	.5	27.4
Presque Isle county	8,474	5	.4	4.7
WESTERN DIVISION.	270,794	519	17.4	6.4
Kent county	132,000	296	9	6.8
Lake county	5,391	20	1	18.5
Mason county	19,367	23	2	10.3
Muskegon county	37,075	77	2	5.4
Newaygo county	18,587	20	.7	3.8
Oceana county	17,282	23	.7	4.1
Ottawa county	41,092	60	2	4.9
NORTHERN CENTRAL DIVISION.	102,076	168.3	7.06	6.9
Clare county	8,638	9	.8	9.3
Gladwin county	6,770	10	.8	11.8
Isabella county	23,188	39	.6	2.6
Mecosta county	20,735	34	1	4.8
Midland county	14,362	24	.8	5.6
Missaukee county	8,893	21	2	22.5
Osceola county	17,844	31	1	5.6
Roscommon county	1,646	.3	.06	3.6

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* † These footnotes are below Table 58 on a preceding page.

TABLE 60.—Concluded.

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
Bay and Eastern Division.	343,384	568	25.6	7.5
Arenac county	8,772	13	.6	6.8
Bay county	63,339	114	5	7.9
Huron county	34,237	42	3	8.8
Lapeer county	27,937	59	2	7.2
Saginaw county	83,704	105	5	6.0
Sanilac county	34,708	36	2	5.8
St. Clair county	55,123	135	5	9.1
Tuscola county	35,564	64	3	8.4
Central Division.	315,688	593	15.4	4.9
Barry county	22,860	26	.8	3.5
Clinton county	25,672	55	2	7.8
Eaton county	31,815	57	1	3.1
Genesee county	41,772	109	2	4.8
Gratiot county	29,716	38	1	3.4
Ingham county	41,777	74	2	4.8
Ionia county	35,007	80	2	5.7
Livingston county	19,523	33	.6	3.1
Montcalm county	33,909	60	2	5.9
Shiawassee county	33,637	61	2	5.9
Southwestern Division.	141,006	230	7.8	5.5
Allegan county	39,110	59	2	5.1
Berrien county	48,234	75	3	6.2
Cass county	20,678	32	.8	3.9
Van Buren county	32,984	64	2	6.1
Southern Central Division.	318,506	597	13.9	4.4
Branch county	26,285	38	1	3.8
Calhoun county	50,673	68	1	2.0
Hillsdale county	29,970	49	1	3.3
Jackson county	47,169	94	2	4.2
Kalamazoo county	46,065	123	3	6.5
Lenawee county	48,792	101	2	4.1
St. Joseph county	24,141	47	.9	3.7
Washtenaw county	45,411	77	3	6.6
Southeastern Division.	454,294	851	65	14.3
Macomb county	32,842	72	5	15.2
Monroe county	33,156	45	1	3.0
Oakland county	44,371	65	2	4.5
Wayne county	343,925	669	57	16.6

* † These footnotes are below Table 58 on a preceding page.

SCARLET FEVER IN URBAN AND RURAL LOCALITIES.

With the exception of groups two and five, shown in Table 61, the death rates from scarlet fever were greater in the urban than in the rural localities.

By Table 61A, it may be seen that, in 1907, the urban localities which showed much higher death rates from scarlet fever than the death rate for this disease for the entire State for that year were: Bay City, Detroit, Escanaba, Grand Rapids, Hancock, Holland, Iron Mountain, Ironwood, Ishpeming, Laurium, Monroe, Muskegon, Negaunee, Pontiac, Port Huron and Wyandotte.

The locality shown in Table 61A, in which the death rate from scarlet fever was much lower in 1907 than the rate for the entire State for that year was: Battle Creek.

The localities, shown in Table 61A, which showed much higher death rates from scarlet fever in 1907 than the average for such localities in the years 1904-6 were: Battle Creek, Bay City, Escanaba, Hancock, Holland, Iron Mountain, Ironwood, Ishpeming, Monroe, Muskegon, Negaunee, Pontiac, Port Huron and Wyandotte.

The localities, shown in Table 61A, which showed much lower death rates from scarlet fever in 1907 than the average for such localities in the years 1904-6 were: Calumet township and Laurium.

There were no deaths from scarlet fever in 1907 in Adrian, Albion, Alpena, Ann Arbor, Benton Harbor, Cadillac, Charlotte, Cheboygan, Coldwater, Flint, Grand Haven, Hillsdale, Houghton, Ionia, Jackson, Kalamazoo, Lansing, Ludington, Manistee, Marquette, Menominee, Mt. Clemens, Mt. Pleasant, Norway, Owosso, Petoskey, Saginaw, St. Joseph, Sault Ste. Marie, Traverse City and Ypsilanti.

TABLE 61. *The prevalence of scarlet fever in urban and rural localities, in Michigan, in 1907.*

Localities—grouped according to density of population.	Population.*	Health jurisdictions.			Cases.	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50,000	451,507	2	2	100	734	80	17.7
Cities from 25,000 to 50,000	149,577	4	4	100	154	5	3.3
Cities from 10,000 to 25,000 and Calumet township (18,253)	255,174	17	14	82	381	14	5.5
Cities and villages from 5,000 to 10,000	175,993	26	22	85	186	16	9.1
Cities and villages under 5,000†	361,839	332	63	19	230	6	1.7
Total urban	1,394,090	381	105	28	1,685	121	8.7
Balance of localities—principally townships‡	1,217,702	1,264	224	18	829	46	3.8

* This footnote is below Table 58, on a preceding page.

† Exclusive of forty-two villages, for which the population in 1907 cannot be correctly estimated.

‡ Includes the forty-two villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

TABLE 61A.—*The prevalence of scarlet fever in 1907, and preceding years, in each of the principal localities included in the first four groups in Table 61.*

Localities.	1907.				Average, 1904–1906.			
	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Population.	Cases.	Deaths.	Deaths per 100,000 inhabitants.
Adrian	11,450	0	0	....	10,937	3	.3	2.7
Albion	5,261	1	0	....	5,049	1	0	....
Alpena	12,849	0	0	....	12,550	1	.3	2.4
Ann Arbor	14,667	6	0	....	14,619	21	0	....
Battle Creek	24,951	30	1	4.0	23,126	18	0	....
Bay City	40,562	45	5	12.3	36,282	‡7	1	2.8
Benton Harbor	6,807	8	0	....	6,737	4	0	....
Cadillac	7,565	1	0	....	7,117	8	1	14.1
Calumet township	18,253	22	1	5.5	17,518	60	9	51.4
Charlotte	5,202	4	0	....	4,885	6	0	....
Cheboygan	6,911	2	0	....	6,790	10	0	....
Coldwater	6,232	1	0	....	6,227	.7	.3	4.8
Detroit	349,674	455	72	20.6	238,114	494	58	17.7
Escanaba	12,260	12	2	16.3	11,485	2	.3	2.6
Flint	16,220	0	0	....	15,329	52	1	6.5
Grand Haven	5,611	15	0	....	5,363	8	0	....
Grand Rapids	101,833	279	8	7.9	97,756	175	6	6.1
Hancock	7,527	†	1	13.3	6,534	0	0	....
Hillsdale	5,303	1	0	....	4,974	11	.7	14.1
Holland	9,848	23	2	20.3	9,260	15	.3	3.2
Houghton	5,086	1	0	....	4,592	0	0	....
Ionia	5,232	6	0	....	5,225	2	0	....
Iron Mountain	8,092	73	5	61.8	8,421	5	0	....
Ironwood	10,255	†	1	9.8	10,098	§2	.3	3.0
Ishpeming	10,399	49	3	28.8	11,215	14	.7	6.2
Jackson	25,390	16	0	....	25,330	44	1	3.9
Kalamazoo	33,816	36	0	....	31,127	51	2	6.4
Lansing	23,119	10	0	....	21,224	14	0	....
Laurium	9,161	†	1	10.9	8,156	†	7	85.8
Ludington	7,329	1	0	....	7,282	3	0	....
Manistee	11,544	4	0	....	12,320	9	1	8.1
Marquette	11,120	22	0	....	10,817	16	.3	2.8
Menominee	9,805	2	0	....	10,666	.3	0	....
Monroe	6,942	12	1	14.4	6,399	1	0	....
Mt. Clemens	7,507	0	0	....	7,241	6	.3	4.1
Mt. Pleasant	5,101	0	0	....	4,690	13	.3	6.4
Muskegon	20,956	163	2	9.5	20,917	71	1	4.8
Negaunee	6,694	5	1	14.9	6,763	12	.7	10.4
Norway	5,385	2	0	....	5,038	3	.3	6.0
Owosso	9,482	0	0	....	9,257	4	0	....
Petoskey	5,112	4	0	....	5,161	3	0	....
Pontiac	11,720	†	1	8.5	11,163	0	0	....
Port Huron	20,681	39	3	14.5	20,246	52	1	4.9
Saginaw	49,809	57	0	....	47,676	16	1	2.1
St. Joseph	5,447	0	0	....	5,364	.3	0	....
Sault Ste. Marie	12,120	10	0	....	11,668	8	1	8.6
Traverse City	12,610	12	0	....	11,695	21	.7	6.0
Wyandotte	5,607	10	5	89.2	5,486	5	1	18.2
Ypsilanti	7,744	12	0	....	7,639	4	0	....

* Estimated for intercensal years.

† Fatal cases only reported.

‡ Does not include West Bay City for 1904, which was consolidated with Bay City in 1905.

§ Average for two years only.

THE REPORTED SOURCES OF CONTAGIUM IN SCARLET FEVER.

By reference to Table 62, it may be seen that in but eight per cent of the outbreaks of scarlet fever was the source of contagium traced by the health officer.

Of the outbreaks in 1906-7, in which the source of contagium was definitely traced, 52 per cent were said to be due to infection from outside jurisdictions and 44 per cent to infection from former cases in the same locality.

The places from which and to which scarlet fever was spread in 1907 are shown in Table 63.

TABLE 62.—*The reported sources of contagium in scarlet fever, in Michigan, in the two years, 1906–1907, as indicated by the number and per cent of instances in which each of the given sources was responsible for the introduction of the disease into a household.*

Sources.	Number of instances.	Per cent of instances in which a source was given.
Outside jurisdictions	150	52.3
Traced to former cases in same locality	127	44.3
At school	6	2.0
Infected premises, clothing, etc	4	1.4
Not stated, or statements doubtful	3,439	*92.0

* Per cent of all households in which scarlet fever occurred.

TABLE 63.—*Localities from which and to which scarlet fever was spread, during the year 1907.*

Spread from:	To:
Allegan County, Clyde Township.	Allegan County, Valley Township.
Antrim County, Echo Township.	Antrim County, Central Lake Village.
Antrim County, Elk Rapids Village.	Grand Traverse County, Whitewater Township.
Berrien County, Benton Harbor City.	Berrien County, Sodus Township.
Branch County, Bethel Township.	Branch County, Coldwater City.
Branch County, Bethel Township.	Branch County, Coldwater Township.
Eaton County, (No locality given.)	Ingham County, Onondaga Township.
Gratiot County, Alma City.	Gratiot County, Arcada Township.
Gratiot County, Alma City.	Gratiot County, Pine River Township.
Gratiot County, Alma City.	Gratiot county, Wheeler Township.
Gratiot County, Breckenridge Village.	Gratiot County, Wheeler Township.
Huron County, Sebewaing Village.	Montmorency County, Albert Township.
Ionia County, Boston Township.	Ionia County, Campbell Township.
Jackson County, Jackson City.	Jackson County, Henrietta Township.
Jackson County, Jackson City.	Jackson County, Parma Village.
Kent County, Grand Rapids City.	Eaton County, Charlotte City.
Kent County, Grand Rapids City.	Kent County, Plainfield Township.
Kent County, Grand Rapids City.	Ottawa County, Holland City.
Lake County, Lake Township.	Lapeer County, Lapeer City.
Mason County, Ludington City.	Mason County, Amber Township.
Menominee County, Menominee City.	Menominee County, Ingalston Township.
Midland County, Jerome Township.	Midland County, Geneva Township.
Montmorency County, Albert Township.	Oscoda County, Clinton Township.
Muskegon County, Muskegon City.	Muskegon County, Sullivan Township.
Oakland County, Pontiac City,	Genesee County, Linden Village.
Oakland County, Pontiac City.	Oakland County, West Bloomfield Twp.
Ontonagon County, Rockland Township.	Ontonagon County, Ontonagon Village.
Osceola County, Sherman Township.	Osceola County, Highland Township.
Ottawa County, Holland City.	Ottawa County, Zeeland City.
Presque Isle County, (No locality given.)	Alpena County, Long Rapids Township.

TABLE 63.—CONCLUDED.

Spread from:	To:	Spread from.	To:
Saginaw County, St. Charles Township.	Saginaw County, Fremont Township.	FROM OUTSIDE THE STATE TO LOCALITIES IN MICHIGAN.	
St. Clair County, Port Huron City.	St. Clair County, Clyde Township.		
St. Joseph County, Mendon Village.	Lake County, Ellsworth Township.	Illinois, Chicago.	Allegan County, Casco Township.
Van Buren County, Bloomingdale Village.	Kalamazoo County, Kalamazoo City.	Illinois, Chicago.	Berrien County, Benton Township.
Van Buren County, South Haven City.	Berrien County, Benton Harbor City.	Illinois, Chicago.	Berrien County, Hagar Township.
Washtenaw County, Ann Arbor City.	Washtenaw County, Webster Township.	Illinois, Chicago.	Berrien County, New Buffalo Township.
Washtenaw County, Manchester Village.	Lenawee County, Tecumseh Village.	Illinois, Chicago.	Lenawee County, Ogden Township.
Wayne County, Detroit City.	Jackson County, Blackman Township.	Illinois, Chicago.	Saginaw County, Tittabawassee Township.
Wayne County, Detroit City.	Mecosta County, Wheatfield Township.	Indiana, Michigan City.	Berrien County, Three Oaks Village.
Wayne County, Detroit City.	Monroe County, Bedford Township.	Montana, (No locality given.)	Cass County, Porter Township.
Wayne County, Detroit City.	Sanilac County, Fremont Township.	Nebraska, (No locality given.)	Jackson County, Grass Lake Township.
Wayne County, Detroit City.	Washtenaw County, Ypsilanti City.	Ohio, Toledo.	Monroe County, Bedford Township.
Wayne County, Detroit City.	Wayne County, Ecorse Township.	Wisconsin, (No locality given.)	Houghton County, Calumet Township.
Wayne County, Detroit City.	Wayne County, Sumpter Township.	Wyoming, (No locality given.)	Allegan County, Plainwell Village.

RESTRICTIVE AND PREVENTIVE MEASURES IN SCARLET FEVER.

Positive statements relative to the measures taken for the restriction and prevention of scarlet fever in 1906-7 were made in eighty-six per cent of the reports from health officers, and of this number, as may be seen by reference to Table 64, the restrictive and preventive measures were stated to have been enforced in seventy-seven per cent, and neglected in nine per cent, of the households. There is a strong probability, however, that, in the 13.9 per cent of the households relative to which no statement was made, the restrictive measures were not enforced, indicating considerable neglect.

By a comparison of Table 64 with the corresponding table on page 137 of the annual report of this Department for 1906, it will be seen that, under the old plan of reporting and compiling by *outbreaks*, the percentage of instances in which the restrictive measures were enforced was but little more than one-third of that under the new method of compiling by *households*. This is taken as a striking example of one of the imperfections of the old plan of reporting and not as an indication that a radical improvement has taken place in the matter of restricting the disease.

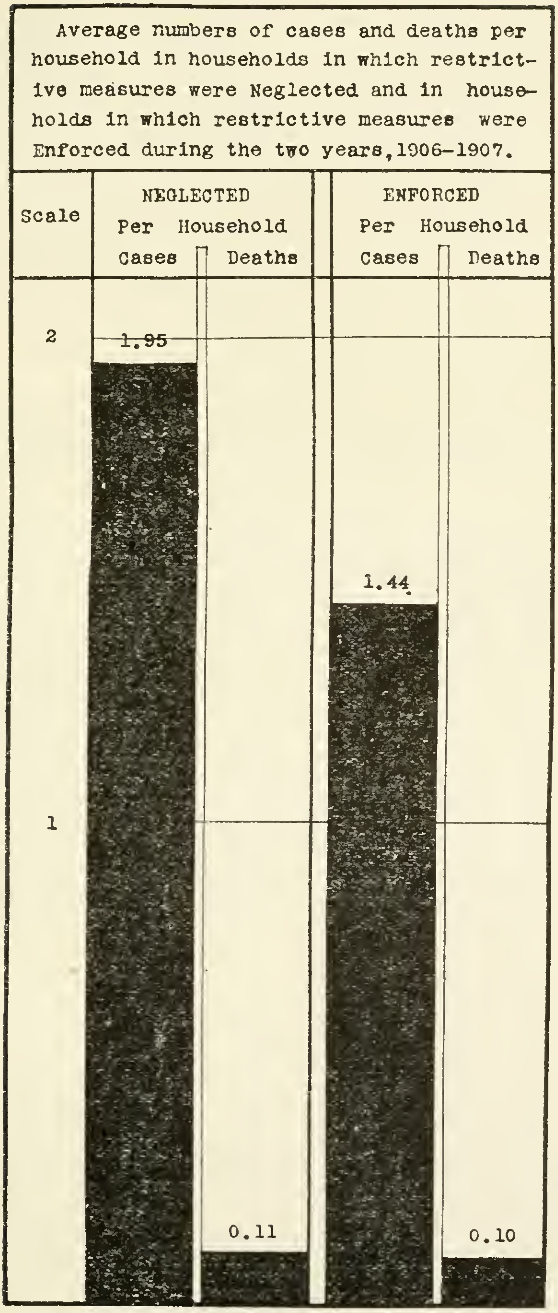
TABLE 64.—*Restrictive and preventive measures in scarlet fever, in Michigan, in the two years, 1906–1907.*

Restrictive and preventive measures.	Number of households.	Per cent.
PLACARDING, ISOLATION AND DISINFECTION:		
Enforced	2,866	76.9
Neglected	342	9.2
Not stated, or statements doubtful	518	13.9

By reason of the fact that this Department has conducted an active campaign against scarlet fever for nearly thirty years, the results, at least in recent years, should be marked by a decreased prevalence of the disease in each year. That this is not so, is believed to be due to the fact that very many new health officers have to be educated each year in the methods of restricting the disease, and to the further fact that very many of the health officers do not receive ample compensation for their labors, but are often denied the support and appreciation which their labors demand and are sometimes subjected to abuse. Under these conditions it is not strange that many outbreaks of disease are not restricted to the first case in a household or to the first household in a locality.

Table 65, and accompanying diagram, are somewhat similar to tables and diagrams, showing the results of efforts for the restriction of scarlet fever, in the annual reports of this Department up to and including the year 1904. It is believed that a continuation of Table 65 for a number of years will show much better results than were shown by the tables in past years, when scarlet fever was studied by *outbreaks*.

SCARLET FEVER RESTRICTED
BY ISOLATION AND DISINFECTION.



Average numbers of cases and deaths per household in households in which restrictive measures were Neglected and in households in which restrictive measures were Enforced during the two years, 1906-1907.

[Plate 1287.]

TABLE 65.—*Showing the total number of households in which scarlet fever was present during the two years, 1906–1907; and the total and average number of cases and deaths in each household in which the restrictive measures were enforced or neglected.*

	Total number of households, 3,726.		Restrictive measures enforced in 2,866 households.		Restrictive measures neglected in 342 households.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals	5,580	392	4,113	285	668	38
Average number per household	1.50	.11	144	.10	1.95	.11

MEASLES IN MICHIGAN IN 1907 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1907, measles was reported present, in this State, in 6,962 households, with a total of 12,139 cases, including 252 deaths.

As only fatal cases of measles were reported from many localities, it was impossible to determine the number of infected households with any degree of accuracy.

By reference to Table 66, it may be seen that in 1907, compared with the preceding year, there were 4,736 cases and 64 deaths more.

In 1907, compared with the average for the seventeen years, 1890-1906, there were 903 cases and 118 deaths more, and the deaths per 100,000 inhabitants were 3.9 more.

A comparison of the death rates in Tables 66 and 67 indicates that, with the exception of the year 1900, as a rule, measles was much more prevalent in the years prior to the inauguration by this Department, in 1890, of active measures for its restriction, than in the years since that time.

TABLE 66.—*The prevalence of measles, in Michigan, during the eighteen years, 1890–1907.*

Years.	Population.*	Reported cases.†	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 of the population.
1890	2,093,889	11,911	140	1.2	6.7
1891	2,130,827	12,173	149	1.2	7.0
1892	2,167,765	3,830	76	2.0	3.5
1893	2,204,703	7,334	119	1.6	5.4
1894	2,241,641	10,518	55	.5	2.5
1895	2,271,531	3,870	12	.3	.5
1896	2,301,421	15,409	156	1.0	6.8
1897	2,331,311	32,543	159	.5	6.8
1898	2,361,201	11,614	124	1.1	5.3
1899	2,391,091	12,005	166	1.4	6.9
1900	2,420,982	20,403	282	1.4	11.6
1901	2,450,872	4,629	62	1.3	2.5
1902	2,475,499	11,978	162	1.4	6.5
1903	2,502,758	8,941	140	1.6	5.6
1904	2,530,016	10,386	176	1.7	7.0
1905	2,557,275	6,061	111	1.8	4.3
1906	2,584,533	7,403	188	2.5	7.3
1907	2,611,792	12,139	252	2.1	9.6
Averages per year	2,368,284	11,286	141	1.2	6.0

* Estimated for intercensal years.

† Only the fatal cases were reported from Detroit, and probably many other localities, so that the figures in this column do not nearly represent the number of cases which occurred.

TABLE 67.—*The number of deaths from measles, in Michigan, per 100,000 persons living, in each of the twenty-one years, 1869–1889. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Years	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Deaths	12.9	4.7	5.5	14.1	18.6	3.4	9.5	8.1	4.1	1.0	10.5
Years	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	Av. 1869–1889.
Deaths	7.6	15.2	8.7	14.5	7.9	2.0	6.8	14.6	20.6	5.1	9.3

GEOGRAPHICAL DISTRIBUTION OF MEASLES.

Table 68 shows that, as indicated by the average death rate for the entire State for the fifteen years, 1893-1907 (6.0 per 100,000), measles was much more prevalent than usual in the Upper Peninsular and Northern, divisions, and quite evenly distributed throughout the other divisions. It was least prevalent in the Central division.

The counties in which measles was unusually prevalent in the fifteen years, 1893-1907, placed in the order of greatest death rates, are as follows:

Alger	with a death rate of	19.2	per 100,000
Bay	" " " " "	18.9	" "
Baraga	" " " " "	18.3	" "
Alcona	" " " " "	14.4	" "
Antrim	" " " " "	13.6	" "
Luce	" " " " "	13.0	" "
Delta	" " " " "	12.4	" "
Montmorency	" " " " "	12.4	" "
Roscommon	" " " " "	12.4	" "
Dickinson	" " " " "	11.7	" "
Oceana	" " " " "	11.5	" "
Oscoda	" " " " "	11.1	" "
Missaukee	" " " " "	11.0	" "
Kalkaska	" " " " "	10.3	" "
Marquette	" " " " "	10.1	" "
Mecosta	" " " " "	9.6	" "
Berrien	" " " " "	8.2	" "
Otsego	" " " " "	8.1	" "

TABLE 68.—*The geographical distribution of measles, in Michigan, in the fifteen years, 1893–1907, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
Upper Peninsular Division.	248,722	1,346	19.57	7.9
Alger county	5,209	32	1	19.2
Baraga county	4,924	7	.9	18.3
Chippewa county	19,668	54	1	5.1
Delta county	24,114	73	3	12.4
Dickinson county	17,081	53	2	11.7
Gogebic county	16,041	95	1	6.2
Houghton county	60,026	375	4	6.7
Iron county	7,280	41	.5	6.9
Keweenaw county	3,593	23	.2	5.6
Luce county	3,081	46	.4	13.0
Mackinac county	7,601	46	.07	.9
Marquette county	39,640	366	4	10.1
Menominee county	25,480	26	.9	3.5
Ontonagon county	6,800	45	.3	4.4
Schoolcraft county	8,184	94	3	3.7
Northwestern Division.	86,426	479	5.4	6.2
Benzie county	10,103	86	.7	6.9
Grand Traverse county	21,337	112	1	4.7
Leelanau county	10,530	45	.7	6.6
Manistee county	27,164	172	2	7.4
Wexford county	17,292	64	1	5.8
Northern Division.	75,635	431	6.0	7.9
Antrim county	14,679	106	2	13.6
Charlevoix county	13,991	86	.6	4.3
Cheboygan county	16,020	31	1	6.2
Crawford county	3,197	23	.2	6.3
Emmet county	14,829	115	1	6.7
Kalkaska county	6,770	51	.7	10.3
Otsego county	6,149	19	.5	8.1
Northeastern Division.	56,588	227	3.4	6.0
Alcona county	5,562	50	.8	14.4
Alpena county	19,199	48	.8	4.2
Iosco county	10,688	27	.3	2.8
Montmorency county	3,216	29	.4	12.4
Ogemaw county	7,418	39	5	6.7
Oscoda county	1,799	1	.2	11.1
Presque Isle county	8,706	33	.4	4.6
Western Division.	271,734	1,922	14.1	5.2
Kent county	132,983	1,240	6	4.5
Lake county	5,273	32	.2	3.8
Mason county	19,481	65	.9	4.6
Muskegon county	36,700	158	2	5.4
Newaygo county	18,518	81	1	5.4
Oceana county	17,334	127	2	11.5
Ottawa county	41,445	219	2	4.8
Northern Central Division.	102,972	579	6.8	6.6
Clare county	8,665	63	.5	5.8
Gladwin county	6,900	19	.3	4.3
Isabella county	23,399	150	1	4.3
Mecosta county	20,728	143	2	9.6
Midland county	14,559	65	.8	5.5
Missaukee county	9,102	39	1	11.0
Osceola county	18,007	91	1	5.6
Roscommon county	1,612	9	.2	12.4

* † These footnotes are below Table 66 on a preceding page.

TABLE 68.—Concluded.

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
BAY AND EASTERN DIVISION.	344,006	1,169	23.1	6.7
Arenac county	8,941	18	.1	1.1
Bay county	63,517	261	12	18.9
Huron county	34,504	52	1	2.9
Lapeer county	27,865	141	1	3.6
Saginaw county	83,490	288	3	3.6
Sanilac county	34,766	137	2	5.8
St. Clair county	55,245	190	2	3.6
Tuscola county	35,678	82	2	5.6
CENTRAL DIVISION.	316,228	1,548	14.6	4.6
Barry county	22,819	17	.8	3.5
Clinton county	25,637	137	.9	3.5
Eaton county	31,785	265	2	6.3
Genesee county	41,925	177	2	4.8
Gratiot county	29,697	165	2	6.7
Ingham county	41,998	171	2	4.8
Ionia county	35,168	166	1	2.8
Livingston county	19,453	115	.9	4.6
Montcalm county	34,000	109	2	5.9
Shiawassee county	33,746	226	1	3.0
SOUTHWESTERN DIVISION.	141,565	870	8	5.7
Allegan county	39,104	242	2	5.1
Berrien county	48,637	291	4	8.2
Cass county	20,673	122	1	4.8
Van Buren county	33,151	215	1	3.0
SOUTHERN CENTRAL DIVISION.	319,601	2,230	15	4.7
Branch county	26,266	236	2	7.6
Calhoun county	51,084	416	3	5.9
Hillsdale county	29,951	195	2	6.7
Jackson county	47,272	265	1	2.1
Kalamazoo county	46,452	423	3	6.5
Lenawee county	48,813	331	1	2.0
St. Joseph county	24,144	159	1	4.1
Washtenaw county	45,619	205	2	4.4
SOUTHEASTERN DIVISION.	459,222	654	30	6.5
Macomb county	32,908	76	2	6.1
Monroe county	33,228	110	2	6.0
Oakland county	44,583	228	2	4.5
Wayne county	348,503	240	24	6.9

* † These footnotes are below Table 66 on a preceding page.

REPORTED SOURCES OF CONTAGIUM IN MEASLES.

Of the outbreaks in 11,053 households in which measles occurred in 1906-7, the source of infection was traced in but 1,168 instances, or less than eleven per cent of the whole number of outbreaks, particulars relative to which may be found in Table 69.

The localities from which and to which measles was spread in 1906 are shown in Table 70.

TABLE 69.—*The reported sources of contagium in measles, in Michigan, in the two years, 1906–1907, as indicated by the number and per cent of instances in which each of the given sources was responsible for the introduction of the disease into a household.*

Sources.	Number of instances.	Per cent of all instances in which a source was given.
Outside jurisdictions	762	65.2
Traced to former cases in same locality	404	34.6
Infected clothing, mail, etc	2	.2
Not stated, or statements doubtful	9,885	*89.4

* Per cent of all households in which measles occurred.

TABLE 70.—*Localities from which and to which measles was spread, during the year 1907.*

Spread from:	To:	Spread from:	To:
Alger County, Munising Village.	Alger County, Mathias Township.	Benzie County, Frankfort Village.	Benzie County, Benzonia Village.
Allegan County, Allegan Village.	Allegan County, Martin Township.	Benzie County, South Frankfort Village.	Benzie County, Benzonia Village.
Allegan County, Gunplain Township.	Kalamazoo county, Alamo Township.	Berrien County, Benton Harbor City.	Berrien County, Benton Township.
Allegan County, Otsego Village.	Allegan County, Watson Township.	Berrien County, Benton Harbor City.	Berrien County, Berrien Township.
Allegan County, Otsego Village.	Kalamazoo County Alamo Township.	Berrien County, Benton Harbor City.	Berrien County, Oronoko Township.
Alpena county, Alpena City.	Alcona County, Curtis Township.	Berrien County, Benton Harbor City,	Berrien County, Watervliet Village.
Antrim County, Mancelona Township.	Antrim County, Star Township.	Berrien County, Berrien Springs Village.	Berrien County, Eau Claire Village.
Barry County, Hastings City.	Barry county, Nashville Village.	Berrien County, Coloma Village.	Berrien County, Watervliet Village.
Bay County, Bay City,	Bay County, Merritt Township.	Berrien County, St. Joseph City.	Berrien County, Benton Harbor City.
Bay County, Bay City.	Bay County, Monitor Township.	Berrien County, Watervliet Trownship.	Van Buren County, Hartford Township.
Bay County, Bay City.	Bay County, Portsmouth Township.	Branch County, Batavia Township.	Branch County, Bethel Township.
Bay County, Bay City.	Bay County, Williams Township.	Branch County, Bronson Village.	Branch County, Bethel Township.
Bay County, Bay City.	Saginaw County, Blumfield Township.	Branch County, Bronson Village.	Branch County, Noble Township.
Bay County, Frankenlust Township.	Bay County, Williams Township.	Branch County, Bronson Village.	St. Joseph County, Fawn River Township.
Bay County, Monitor Township.	Bay County, Williams Township.	Branch County, Gilead Township.	Branch County, Union City Village.
Bay County, (No locality given.)	Iosco County, Burleigh Township.	Branch County, Kinderhook Township.	Branch County, Noble Township.

TABLE 70.—CONTINUED.

Spread from:	To:	Spread from:	To:
Branch County, (No locality given.)	St. Joseph County, Centerville Village.	Calhoun County, Homer Village.	Calhoun County, Clarenden Township.
Branch County, Quincy Village.	St. Joseph County, White Pigeon Village.	Calhoun County, Marshall City.	Calhoun County, Eckford Township.
Branch County, Union City Village.	Calhoun County, Athens Township.	Calhoun County, Marshall City.	Calhoun County, Emmet Township.
Calhoun County, Albion City.	Calhoun County, Eckford Township.	Calhoun County. Marshall City.	Calhoun County, Fredonia Township.
Calhoun County, Albion City.	Calhoun County, Marengo Township.	Calhoun County, Marshall City.	Calhoun County, Marengo Township.
Calhoun County, Albion City.	Jackson County, Hanover Township.	Calhoun County, Marshall City.	Calhoun County, Marshall Township.
Calhoun County, Athens Village.	Calhoun County. Athens Township.	Calhoun County, Marshall Township.	Calhoun County, Fredonia Township.
Calhoun County, Athens Village.	Kalamazoo County, Pavilion Township.	Calhoun County, Sheridan Township.	Calhoun County, Marengo Township.
Calhoun County, Battle Creek City.	Barry County, Barry Township.	Cass County, Dowagiac City.	Berrien County, Benton Harbor City.
Calhoun County, Battle Creek City.	Barry County, Maple Grove Township.	Cass County, Dowagiac City.	Cass County, Silver Creek Township.
Calhoun County, Battle Creek City.	Calhoun County, Athens Township.	Cass County, Dowagiac City.	Van Buren County, Hartford Township.
Calhoun County, Battle Creek City.	Calhoun County, Eckford Township.	Cass County, Volinia Township.	Cass County, Wayne Township.
Calhoun County, Battle Creek City.	Calhoun County, Emmet Township.	Cass County, Wayne Township.	Cass County, Volinia Township.
Calhoun County, Battle Creek City.	Calhoun County, Le Roy Township.	Cheboygan County, Cheboygan City.	Presque Isle County, Bearinger Township.
Calhoun County, Battle Creek City.	Lapeer County, Attica Township.	Clinton County, Olive Township.	Clinton County, Bath Township.
Calhoun County, Homer Village.	Calhoun County, Albion Township.	Clinton County, Olive Township.	Clinton County, De Witt Township.

TABLE 70.—CONTINUED.

Spread from:	To:	Spread from:	To:
Clinton County, Ovid Village.	Shiawassee County, Middleburg Township.	Grand Traverse County, Fife Lake Village.	Chippewa County, Trout Lake Township.
Clinton County, St. Johns City.	Clinton County, Bengal Township.	Grand Traverse County, Traverse City.	Antrim County, Milton Township.
Eaton County, Benton Township.	Eaton County, Chester Township.	Grand Traverse County, Traverse City.	Benzie County, Almira Township.
Eaton County, Charlotte City.	Eaton County, Chester Township.	Grand Traverse County, Traverse City.	Leelanau County, Glen Arbor Township.
Eaton County, Charlotte City.	Eaton County, Walton Township.	Gratiot County, Arcada Township.	Gratiot County, Hamilton Township.
Genesee County, Fenton Village.	Oakland County, Highland Township.	Gratiot County, Ithaca Village.	Gratiot County, Newark Township.
Genesee County, Flint City.	Cass County, Cassopolis Village.	Gratiot County, St. Louis City.	Gratiot County, Emerson Township.
Genesee County, Flint City.	Eaton County, Sunfield Township.	Gratiot County, St. Louis City.	Gratiot County, Wheeler Township.
Genesee County, Flint City.	Ionia County, Muir Village.	Hillsdale County, Litchfield Township.	Calhoun County, Clarenden Township.
Genesee County, Flint City.	Oakland County, Avon Township.	Hillsdale County, Litchfield Village.	Calhoun County, Homer Township.
Genesee County, Flint City.	Otsego County, Gaylord Village.	Hillsdale County, Moscow Township.	Hillsdale County, Somerset Township.
Genesee County, Flint Township.	St. Clair County, Brockway Township.	Jackson County, Concord Village.	Calhoun County, Homer Village.
Genesee County, Genesee Township.	Genesee County, Richfield Township.	Jackson County, Hanover Village.	Jackson County, Hanover Township.
Genesee County, Linden Village.	Genesee County, Argentine Township.	Jackson County, Jackson City.	Branch County, Mattison Township.
Genesee County, Linden Village.	Livingston County, Deerfield Township.	Jackson County, Jackson City.	Branch County, Union Township.
Genesee County, Thetford Township.	Genesee County, Richfield Township.	Jackson County, Jackson City.	Calhoun County, Albion Township.

TABLE 70.—Continued.

Spread from:	To:	Spread from:	To:
Jackson County, Jackson City.	Calhoun County, Marengo Township.	Ingham County, Lansing City.	Calhoun County, Marshall Township.
Jackson County, Jackson City.	Gratiot County, Ashley Village.	Ingham County, Lansing City.	Clinton County, De Witt Township.
Jackson County, Jackson City.	Hillsdale County, Camden Village.	Ingham County, Lansing City.	Clinton County, Eagle Township.
Jackson County, Jackson City.	Jackson County, Hanover Township.	Ingham County, Lansing City.	Genesee County, Richfield Township.
Jackson County, Jackson City.	Jackson County, Henrietta Township.	Ingham County, Lansing City.	Gratiot County, Lafayette Township.
Jackson County, Jackson City.	Jackson County, Napoleon Township.	Ingham County, Lansing City.	Ingham County, Delhi Township.
Jackson County, Jackson City.	Jackson County, Rives Township.	Ingham County, Lansing City.	Livingston County, Cohoctah Township.
Jackson County, Jackson City,	Jackson County, Spring Arbor Township.	Ingham County, Lansing City.	Livingston County, Hardy Township.
Jackson County, Jackson City.	Jackson County, Waterloo Township.	Ingham County, Lansing City.	Shiawassee County, Morrice Village.
Jackson County, Jackson City.	Ottawa County, Olive Township.	Ingham County, Stockbridge Township.	Jackson County, Henrietta Township.
Jackson County, Liberty Township.	Jackson County, Hanover Township.	Ingham County, Williamston Village.	Livingston County, Fowlerville Village.
Jackson County, Liberty Township.	Calhoun County, Marengo Township.	Ionia County, Boston Township.	Ionia County, Saranac Village.
Jackson County, Sandstone Township.	Jackson County Spring Arbor Township.	Ionia County, Lake Odessa Village.	Barry County, Woodland Township.
Ingham County, Bunkerhill Township.	Jackson County, Henrietta Township.	Ionia County, Sebewa Township.	Ionia County, Orange Township.
Ingham County, Lansing City.	Barry County, Woodland Village.	Ionia County, Sebewa Township.	Kent County, Courtland Township.
Ingham County, Lansing City.	Berrien County, Pipestone Township.	Kalamazoo County, Climax Village.	Calhoun County, Le Roy Township.

TABLE 70—CONTINUED.

Spread from:	To:	Spread from:	To:
Kalamazoo County, Cooper Township.	Allegan County, Plainwell Village.	Lenawee County, Adrian City.	Branch County, Coldwater City.
Kalamazoo County, Galesburg Village.	Kalamazoo County, Pavilion Township.	Lenawee County, Adrian City.	Lenawee County, Adrian Township.
Kalamazoo County, Kalamazoo City.	Allegan County, Manlius Township.	Lenawee County, Adrian City.	Lenawee County, Blissfield Village.
Kalamazoo County, Kalamazoo City.	Berrien County, Benton Harbor City.	Lenawee County, Adrian City.	Lenawee County, Seneca Township.
Kalamazoo County, Kalamazoo City.	Calhoun County, Tekonsha Township.	Lenawee County, Franklin Township.	Lenawee County, Adrian Township.
Kalamazoo County, Kalamazoo City.	Van Buren County, Paw Paw Township.	Livingston County, Cohoctah Township.	Livingston County, Deerfield Township.
Kalamazoo County, Kalamazoo City.	Van Buren County, Paw Paw Village.	Livingston County, Fowlerville Village.	Livingston County, Conway Township.
Kalamazoo County, Texas Township.	Kalamazoo County, Portage Township.	Livingston County, Howell Village.	Livingston County, Cohoctah Township.
Kalkaska County, Kalkaska Village.	Kalkaska County, Orange Township.	Livingston County, Howell Village.	Livingston County, Hartland Township.
Kent County, Grand Rapids City.	Eaton County, Windsor Township.	Livingston County, Unadilla Township.	Ingham County, White Oak Township.
Kent County, Grand Rapids City.	Hillsdale County, Wright Township.	Macomb County, Mt. Clemens City.	Ogemaw County, Cumming Township.
Kent County, Grand Rapids City.	Ionia County, Boston Township.	Macomb County, Romeo Village.	Lapeer County, Almont Township.
Kent County, Grand Rapids City.	Kent County, Walker Township.	Macomb County, Washington Township.	Macomb County, Ray Township.
Kent County, Grand Rapids City.	Lapeer County, Almont Township.	Manistee County, Copemish Village.	Manistee County, Manistee City.
Kent County, Grand Rapids City.	Lapeer County, North Branch Village.	Mecosta County, Big Rapids City.	Osceola County, Reed City Village.
Kent County, Grand Rapids City.	Ottawa County, Georgetown Township.	Mecosta County, Green Township.	Mecosta County, Grant Township.

TABLE 70.—CONTINUED.

Spread from:	To:	Spread from:	To:
Mecosta County, Mecosta Village.	Mecosta County, Wheatland Township.	Otsego County, Gaylord Village.	Montmorency County, Vienna Township.
Midland County, Midland City.	Midland County Ingersoll Township.	Otsego County, Gaylord Village.	Otsego County, Hayes Township.
Monroe County Bedford Township.	Monroe County, Erie Township.	Saginaw County, Chapin Township.	Clinton County, Elsie Village.
Montcalm County, Greenville City.	Gratiot County, Wheeler Township.	Saginaw County, Chapin Township.	Shiawassee County, Fairfield Township.
Muskegon County, Muskegon City.	Muskegon County, Dalton Township.	Saginaw County, Chesaning Village.	Saginaw County, Chesaning Township.
Muskegon County, Muskegon City.	Muskegon County, Sullivan Township.	Saginaw County, Saginaw City.	Gratiot County, Wheeler Township.
Newaygo County, Fremont Village.	Kent County, Walker Township.	Saginaw County, Saginaw City.	Saginaw County, Tittabawassee Township.
Newaygo County, Newaygo Village.	Newaygo County, Ashland Township.	Saginaw County, St. Charles Township.	Saginaw County, Brady Township.
Newaygo County, Newaygo Village.	Newaygo County, Grant Village.	Sanilac County, Bridgehampton Township.	Sanilac County, Marion Township.
Oakland County, Clarkston Village.	Oakland County, Waterford Township.	Sanilac County, Deckerville Village.	St. Clair County, Yale City.
Oakland County, Holly Village.	Oakland County, White Lake Township.	Schoolcraft County, Doyle Township.	Schoolcraft County, Muller Township.
Oakland County, Milford Village.	Oakland County, Highland Township.	Shiawassee County, Corunna Village.	St. Clair County, St. Clair City.
Oakland County, Milford Village.	Oakland County, Milford Township.	Shiawassee County, Durand Village.	Genesee County, Gaines Township.
Oakland County, Oxford Village.	Oalkand County, Brandon Township.	Shiawassee County, Durand Village.	Shiawassee County, Vernon Township.
Oakland County, Pontiac City.	Oakland County, White Lake Township.	Shiawassee County, Fairfield Township.	Shiawassee County, Middleburg Township.
Oakland County, Troy Township.	Oceana County, Colfax Township.	Shiawassee County, Morrice Village.	Shiawassee County, Perry Township.

TABLE 70.—CONTINUED.

Spread from:	To:	Spread from:	To:
Shiawassee County, Owosso City.	Clinton County, Elsie Village.	Tuscola County, Wisner Township.	Tuscola County, Akron Township.
Shiawassee County, Owosso City.	Shiawassee County, Fairfield Township.	Van Buren County, Decatur Village.	Berrien County, Benton Harbor City.
Shiawassee County, Owosso City.	Shiawassee County, Middleburg Township.	Van Buren County, Decatur Village.	Van Buren County, Hartford Township.
Shiawassee County, Owosso City.	Shiawassee County, Rush Township.	Van Buren County, Gobleville Village.	Van Buren County, Waverly Township.
Shiawassee County, Owosso Township.	Shiawassee County, Middleburg Township.	Washtenaw County, Ypsilanti City.	Branch County, Gilead Township.
Shiawassee County, Rush Township.	Saginaw County, Brady Township.	Wayne County, Detroit City.	Macomb County, Mt. Clemens City.
St. Clair County, Port Huron City.	Emmet County, Bear Creek Township.	Wayne County, Detroit City.	Saginaw County, Chesaning Village.
St. Joseph County, Colon Township.	St. Joseph County, Park Township.	Wayne County, Detroit City.	Schoolcraft County, Germfask Township.
St. Joseph County, Sturgis City.	Branch County, Bronson Township.	Wayne County, Ecorse Township.	Wayne County, Wayne Village.
St. Joseph County, Sturgis City.	Branch County, Bronson Village.	Wayne County, Northville Village.	Oakland County, Milford Township.
St. Joseph County, Sturgis City.	St. Joseph County, Fawn River Township.	Wayne County, Plymouth Village.	Oakland County, White Lake Township.
St. Joseph County, Sturgis City.	St. Joseph County, Sturgis Township.	Wexford County, Cadillac City.	Emmet County, Petoskey City.
Tuscola County, Akron Township.	Montmorency County, Vienna Township.	Wexford County, Cadillac City.	Montcalm County, Sheridan Village.

TABLE 70—Concluded.

Spread from:	To:	Spread from:	To:
From Outside the State to Localities in Michigan.		Indiana, South Bend.	St. Joseph County, Constantine Township.
California, (No locality given.)	Barry County, Woodland Township.	Kansas, (No locality given.)	Lenawee County, Tecumseh Village.
Canada, (No locality given.)	Grand Traverse County, Paradise Township.	North Dakota, (No locality given.)	Shiawassee County, Vernon Township.
Florida, Jacksonville.	Berrien County, Benton Harbor City.	Ohio, (No locality given.)	Branch County, Bethel Township.
Florida, (No locality given.)	Lenawee County, Morenci Village.	Ohio, (No locality given.)	Calhoun County, Eckford Township.
Florida, (No locality given.)	Manistee County, Manistee City.	Ohio, (No locality given.)	Clinton County, Lebannon Township.
Illinois, Chicago.	Allegan County, Douglas Village.	Ohio, (No locality given.)	Emmet County, Bear Creek Township.
Illinois, Chicago.	Branch County, Coldwater City.	Ohio, (No locality given.)	Midland County, Jasper Township.
Illinois, Chicago.	Calhoun County, Marshall City.	Ohio, Paulding County.	Calhoun County, Eckford Township.
Illinois, Chicago.	Cass County, Dowagiac City.	Ohio, Toledo.	Cheboygan County, Mackinac Township.
Illinois, Chicago.	St. Joseph County, White Pigeon Village.	Ohio, Toledo.	Gratiot County, Wheeler Township.
Indiana, (No locality given.)	Hillsdale County, Camden Township.	Ohio, Toledo.	Lenawee County, Ogden Township.
Indiana, (No locality given.)	Hillsdale County, Wright Township.	Ohio, Toledo.	Monroe County, Bedford Township.

RESTRICTIVE AND PREVENTIVE MEASURES IN MEASLES.

Table 71 indicates that in but forty per cent of the households in which measles occurred in 1906-7, were the restrictive and preventive measures all enforced. This, however, is a much better showing than was made in preceding reports, when the disease was studied by *outbreaks*, as may be seen by reference to Table 71, on page 148 of the annual report of this Department for 1906, and is an indication of the more scientific method of studying the disease by *households*, and not an indication that measles is being restricted to a much greater extent than in the preceding years. The fact that, in 1906-7, sixty-five per cent of the outbreaks of measles were traced to infection from outside jurisdictions, is a very good indication that the disease is not being restricted to any considerable extent.

In the past, the question has frequently arisen as to the necessity for placarding in outbreaks of measles, and many health officers have experienced considerable difficulty in the performance of their duty in this respect. The duty of the health officer is clearly outlined in Section 4450 of the Compiled Laws of 1897 which provides that when any disease dangerous to the public health exists in a locality, the board of health shall use all possible care to prevent the spread of infection, and give public notice of infected places, by placard on the premises and otherwise if necessary.

The apathy of the people in respect to the restriction and prevention of measles has done much to discourage those who would put forth their best energies in the work of restricting this often underestimated but really dangerous disease.

Parents are ignorant of or indifferent to the danger to be apprehended from the exposure of their children to measles, and, in many instances, do not secure the services of a physician for their children when suffering from this disease. Many parents are also ignorant of their duty, under the law, in respect to the reporting of cases of measles to the local health officials, and, as a consequence, the health officials are not in a position to institute restrictive measures or to make complete reports to this Department relative to the prevalence of measles in their locality. To the parents then we must look primarily for any considerable reduction in the sickness and mortality from measles, and for more complete reports of the disease. This means educational work on the part of those who have charge of the health service of the State, both local and general, and the State Health Department stands ready at all times to assist the local health officials in this educational work, by means of advice, and by the furnishing of documents on the restriction and prevention of measles for distribution among the families and neighbors of those sick with the disease. A leaflet issued by the local board of health, setting forth the dangerous character of measles and the duty of householders in outbreaks of the disease, and widely distributed at a time when measles was present in any locality, would, it is believed, prove to be one of the best methods for securing the coöperation of the people in the restriction of the disease. And the educational work should be continued from time to time as measles may appear in the locality until the people are thoroughly awakened to the necessity for its restriction.

A suggested form of leaflet for this purpose, which, however, may be changed to suit the needs of the locality, was printed in the annual reports for 1906 and 1907, and is here reprinted for the benefit of those who may not be in possession of a copy of the preceding reports.

MEASLES IS PRESENT IN THIS LOCALITY.

Measles is a Dangerous Disease, and Can and Should be Restricted and Prevented.

In Michigan, measles causes eleven times as many deaths as does smallpox, and yet the people become alarmed whenever smallpox appears in a locality, and immediately institute rigid measures for its restriction, even to the extent of placing guards outside the premises where it occurs to maintain the quarantine.

There are two erroneous and very harmful beliefs, quite prevalent among parents,—that measles cannot ultimately be escaped any more than teething, and that the least dangerous time for persons to have the disease is while quite young children. Statistics have proved that measles can be restricted and prevented, and that the disease is most fatal among the very young, sixty-four per cent of all the deaths from measles occurring in those under five years.

If then we safeguard our children, especially the very young, from the infection of measles, the probability of their dying from or even contracting the disease in advanced youth, or in the years of maturity or old age, will be very remote.

But the fatality from measles is not the only danger to be apprehended. Measles is frequently complicated with or followed by the two most dangerous diseases,—pneumonia and tuberculosis—and often leaves a weakness of the eyes, ears, bowels and the respiratory organs.

Upon the outbreak of measles in any household, it is the duty of the householder, and the attending physician, if any is called, to at once notify the local health officer of the same, and every person who has any regard for the welfare of the community should cheerfully comply with the law in this particular.

Measles may be spread by the sick before the eruption appears, and, for this reason, the parents of young children should be suspicious of a troublesome cough, or frequent sneezing, especially if accompanied by a fever, and should immediately separate the child so affected from the well persons, and keep him or her isolated until satisfied that the symptoms are not those of measles or of any other dangerous communicable disease.

Information relative to the proper methods of restricting and preventing measles may be obtained by application to the health officer of the locality.

By order of the Board of Health of the .... of ....,

____
President.

____
Secretary.

____
Date.

TABLE 71.—*Restrictive and preventive measures, in measles, in Michigan, in the two years, 1906–1907.*

Restrictive and preventive measures.	Number of instances.	Per cent.
PLACARDING, ISOLATION AND DISINFECTION:		
Enforced	4,445	40
Neglected	2,711	25
Not stated, or statements doubtful	3,897	35

SMALLPOX IN MICHIGAN IN 1907 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1907, smallpox was reported present in 864 households in this State, with an aggregate of 1,712 cases, including 8 deaths.

By Table 72 it may be seen that, in 1907, compared with the number of cases and deaths from smallpox in the preceding year, there were 472 cases and 5 deaths more.

In 1907, compared with the average number of cases and deaths from smallpox for the six years, 1901-1906, there were 3,037 cases and 26 deaths less.

A comparison of smallpox in 1907 with the years prior to 1901 may be made by reference to Table 72, in which it will be seen that from 1882 to 1901 there was, comparatively, but little smallpox in the State. The fatality (deaths per 100 cases), however, was very much greater in the years in which deaths occurred prior to 1901.

Table 73 shows that the average number of deaths from smallpox, per 100,000 of the population, for the thirteen years prior to the institution by this Department, of active measures for the restriction of this disease, was very much greater than the average for the twenty-six years since that time. Excluding the year 1882, in which the results of the educational work could scarcely be expected to show any marked results, the death rate for the twenty-five years, ending in 1907, was about seven-tenths of one per cent per 100,000.

TABLE 72.—*The prevalence of smallpox, in Michigan, during the twenty-six years, 1892–1907.*

Years.	Population.*	Reported cases.	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 of the population.
1882	1,745,298	589	159	27.0	9.1
1883	1,799,478	29	2	6.9	.1
1884	1,853,658	22	3	13.6	.2
1885	1,893,697	27	6	22.2	.3
1886	1,933,735	24	7	29.2	.4
1887	1,973,774	4	0	....	....
1888	2,013,812	42	6	14.3	.3
1889	2,053,851	57	4	7.0	.2
1890	2,093,889	2	0	....	....
1891	2,130,827	3	0	....	....
1892	2,167,765	1	1	100.0	.05
1893	2,204,703	10	3	30.0	.1
1894	2,241,641	285	60	21.1	2.7
1895	2,271,531	187	47	25.1	2.1
1896	2,301,421	38	16	42.1	.7
1897	2,331,311	15	0	....	....
1898	2,361,201	32	1	3.1	.04
1899	2,391,091	139	6	4.3	.3
1900	2,420,982	694	9	1.3	.4
1901	2,450,872	5,088	31	.6	1.3
1902	2,475,499	7,086	40	.6	1.6
1903	2,502,758	6,341	33	.5	1.3
1904	2,530,016	5,753	24	.4	.9
1905	2,557,275	2,985	74	2.5	2.9
1906	2,584,533	1,240	3	.2	.1
1907	2,611,792	1,712	8	.5	.3
Averages per year	2,226,785	1,247	21	1.7	.9

* Estimated for intercensal years.

TABLE 73.—*The number of deaths from smallpox, in Michigan, per 100,000 persons living in each of the thirteen years, 1869–1881. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Years	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	Average, 1869–81.
Deaths	3.7	0.8	6.0	23.7	7.0	1.3	1.8	5.2	6.8	0.4	0.4	0.2	4.9	4.8

GEOGRAPHICAL DISTRIBUTION OF SMALLPOX.

Table 74 indicates that, according to the average case rate for smallpox for the entire State (125 cases per 100,000 of the population), during the ten years, 1898-1907, this disease was more prevalent than usual in the Northern, Northeastern, Northern Central and Bay and Eastern divisions.

As indicated by the case rates, the counties in which smallpox was much more than usually prevalent during the ten years, 1898-1907, placed in the order of greatest case rates, are:

Isabella	with a case rate of	466	cases per 100,000
Cheboygan	" " " " "	451	" " "
Gladwin	" " " " "	448	" " "
Kalkaska	" " " " "	385	" " "
Otsego	" " " " "	385	" " "
Missaukee	" " " " "	372	" " "
Bay	" " " " "	372	" " "
Osceola	" " " " "	351	" " "
Alcona	" " " " "	337	" " "
Ogemaw	" " " " "	325	" " "
Clare	" " " " "	324	" " "
Montmorency	" " " " "	316	" " "
Iosco	" " " " "	313	" " "
Gratiot	" " " " "	295	" " "
Arenac	" " " " "	286	" " "
Mackinac	" " " " "	280	" " "
Alpena	" " " " "	249	" " "
Mecosta	" " " " "	248	" " "
Antrim	" " " " "	244	" " "
Roscommon	" " " " "	244	" " "
Presque Isle	" " " " "	241	" " "
Lake	" " " " "	238	" " "
Emmet	" " " " "	222	" " "
Midland	" " " " "	208	" " "
Oceana	" " " " "	205	" " "
Charlevoix	" " " " "	203	" " "
Crawford	" " " " "	202	" " "
Mason	" " " " "	197	" " "
Sanilac	" " " " "	186	" " "
Clinton	" " " " "	185	" " "
Saginaw	" " " " "	180	" " "
Huron	" " " " "	176	" " "
Montcalm	" " " " "	172	" " "
Menominee	" " " " "	171	" " "
Osceola	" " " " "	166	" " "
Chippewa	" " " " "	163	" " "
Shiawassee	" " " " "	159	" " "
Genesee	" " " " "	153	" " "

TABLE 74.—*The geographical distribution of smallpox, in Michigan, in the ten years, 1898–1907, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	266,569	253	2.3	.9
Alger county	6,192	7	0	....
Baraga county	5,120	7	0	....
Chippewa county	21,429	35	.4	1.9
Delta county	26,049	38	.7	2.7
Dickinson county	18,152	9	0	....
Gogebic county	16,805	10	0	....
Houghton county	66,856	35	.4	.6
Iron county	8,759	6	0	....
Keweenaw county	4,015	2	0	....
Luce county	3,461	4	0	....
Mackinac county	7,857	22	.2	2.5
Marquette county	40,167	19	.4	1.0
Menominee county	26,249	45	.2	.8
Ontonagon county	6,909	2	0	....
Schoolcraft county	8,549	12	0	....
NORTHWESTERN DIVISION.	90,387	96	.3	.3
Benzie county	10,770	12	0	....
Grand Traverse county	22,728	29	.2	.9
Leelanau county	10,867	4	0	....
Manistee county	27,453	25	0	....
Wexford county	18,569	26	.1	.5
NORTHERN DIVISION.	81,887	243	.9	1.1
Antrim county	15,554	38	.2	1.3
Charlevoix county	15,305	31	0	....
Cheboygan county	16,842	76	.2	1.2
Crawford county	3,472	7	0	....
Emmet county	16,678	37	.4	2.4
Kalkaska county	7,275	28	.1	1.4
Otsego county	6,761	26	0	....
NORTHEASTERN DIVISION.	59,073	165	.8	1.4
Alcona county	5,633	19	0	....
Alpena county	19,673	49	.3	1.5
Iosco county	10,222	32	.1	1.0
Montmorency county	3,486	11	0	....
Ogemaw county	8,301	27	.1	1.2
Oscoda county	1,808	3	0	....
Presque Isle county	9,950	24	.3	3.0
WESTERN DIVISION.	276,457	299	4.9	1.8
Kent county	137,004	131	4	2.9
Lake county	5,038	12	0	....
Mason county	19,757	39	.2	1.0
Muskegon county	36,725	22	.2	.5
Newaygo county	18,183	15	.1	.5
Oceana county	17,589	36	0	....
Ottawa county	42,161	44	.4	.9
NORTHERN CENTRAL DIVISION.	106,429	364	.9	.8
Clare county	8,958	29	.1	1.1
Gladwin county	7,813	35	0	....
Isabella county	24,038	112	.2	.8
Mecosta county	20,598	51	.2	1.0
Midland county	14,909	31	0	....
Missaukee county	9,937	37	.1	1.0
Osceola county	18,539	65	.3	1.6
Roscommon county	1,637	4	0	....

* Estimated for intercensal years.

TABLE 74.—Concluded.

Geographical divisions.	Average.			
	Population.*	Cases.	Deaths.	Death rates.
Bay and Eastern Division.	347,237	664	2.7	8
Arenac county	9,783	28	.2	2.0
Bay county	64,013	238	.6	.9
Huron county	35,164	62	.4	1.1
Lapeer county	27,400	32	.1	.4
Saginaw county	84,366	152	.7	.8
Sanilac county	35,007	65	.3	.9
St. Clair county	55,431	37	.3	.5
Tuscola county	36,073	50	1	.3
Central Division.	316,381	456	1.8	.6
Barry county	22,390	20	0	....
Clinton county	25,356	47	.2	.8
Eaton county	31,303	45	.1	.3
Genesee county	42,471	65	.3	.7
Gratiot county	30,144	89	.3	1.0
Ingham county	42,900	23	0	....
Ionia county	35,090	51	.2	.6
Livingston county	19,013	4	0	....
Montcalm county	33,731	58	.3	.9
Shiawassee county	33,983	54	.4	1.2
Southwestern Division.	143,154	94	.7	.5
Allegan county	39,034	19	.1	.3
Berrien county	49,595	32	.3	.6
Cass county	20,394	10	0	....
Van Buren county	34,131	33	.3	.9
Southern Central Division.	323,415	182	3.3	1.0
Branch county	26,369	11	.2	.8
Calhoun county	52,394	55	.2	.4
Hillsdale county	29,840	22	.3	1.0
Jackson county	47,453	30	2	4.2
Kalamazoo county	48,302	19	.3	.6
Lenawee county	48,938	8	.1	2
St. Joseph county	23,606	15	.2	.8
Washtenaw county	46,513	22	0	....
Southeastern Division.	483,707	306	3.8	.8
Macomb county	33,098	31	.4	1.2
Monroe county	33,146	28	.1	.3
Oakland county	45,359	37	.3	.7
Wayne county	372,104	210	3	8

* Estimated for intercensal years.

THE PREVALENCE OF SMALLPOX IN URBAN LOCALITIES.

By Table 75, it may be seen that, in 1907, a much greater proportion of urban than rural localities were infected with smallpox. It may also be seen that the case rate (number of cases per 100,000 inhabitants) was higher in the rural than in the urban localities, indicating that the disease was most prevalent in the rural localities.

By Table 75A, it may be seen that, in 1907, the urban localities which showed much higher case rates from smallpox than the case rate for this disease for the entire State for that year (65.5 per 100,000 population) were: Coldwater, Hillsdale, Ionia, Ludington, Manistee, Monroe, Mt. Clemens, Petoskey, Saginaw and Traverse City.

The localities, shown in Table 75A, in which the case rates from smallpox were much lower in 1907 than the rate for the entire State for that year were: Albion, Ann Arbor, Calumet township, Charlotte, Flint, Grand Rapids, Holland, Jackson, Kalamazoo, Lansing, Menominee, Mt. Pleasant, Muskegon, Pontiac, St. Joseph, Sault Ste. Marie and Ypsilanti.

The localities, shown in Table 75A, which showed much higher case rates from smallpox in 1907 than the average for such localities in the years 1904-6 were: Calumet township, Coldwater, Detroit, Hillsdale, Ionia, Ludington, Manistee, Monroe, Mt. Clemens, Petoskey, St. Joseph, Sault Ste. Marie and Traverse City.

The localities, shown in Table 75A, which showed much lower case rates from smallpox in 1907 that the average for such localities in the years 1904-6 were: Albion, Ann Arbor, Battle Creek, Bay City, Charlotte, Flint, Grand Rapids, Holland, Jackson, Kalamazoo, Lansing, Mt. Pleasant, Muskegon, Pontiac, Saginaw and Ypsilanti.

There were no cases of smallpox in 1907 in Adrian, Alpena, Benton Harbor, Cadillac, Cheboygan, Escanaba, Grand Haven, Hancock, Houghton, Iron Mountain, Ironwood, Ishpeming, Laurium, Marquette, Negaunee, Norway, Owosso, Port Huron and Wyandotte.

TABLE 75.—*The prevalence of smallpox in urban and rural localities, in Michigan, in 1907.*

Localities—grouped according to density of population.	Population.*	Health jurisdictions.			Cases.	Deaths.	Case rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50,000	451,507	2	2	100	197	1	43.6
Cities from 25,000 to 50,000	149,577	4	4	100	115	0	76.9
Cities from 10,000 to 25,000 and Calumet township (18,253)	255,174	17	10	59	169	0	66.2
Cities and villages from 5,000 to 10,000	175,993	26	14	54	111	2	63.1
Cities and villages under 5,000†	361,839	332	39	12	267	2	73.8
Total urban	1,394,090	381	69	18	859	5	61.6
Balance of localities—principally townships‡	1,217,702	1,264	158	13	853	3	70.0

* This footnote is below Table 72, on a preceding page.

† Exclusive of forty-two villages, for which the population in 1907 cannot be correctly estimated.

‡ Includes the forty-two villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

TABLE 75A.—*The prevalence of smallpox in 1907, and preceding years, in each of the principal localities included in the first four groups in Table 75.*

Localities.	1907.			Average, 1904–1906.		
	Population.*	Cases.	Cases per 100,000 inhabitants.	Population.*	Cases.	Cases per 100,000 inhabitants.
Adrian	11,450	0	....	10,937	1	9.1
Albion	5,261	1	19.0	5,049	5	99.0
Alpena	12,849	0	....	12,550	6	47.8
Ann Arbor	14,667	2	13.6	14,619	13	88.9
Battle Creek	24,951	16	64.1	23,126	39	168.6
Bay City	40,562	30	74.0	36,282	†171	471.3
Benton Harbor	6,807	0	....	6,737	.3	4.5
Cadillac	7,565	0	....	7,117	6	84.3
Calumet township	18,253	6	32.9	17,518	0	....
Charlotte	5,202	1	19.2	4,885	5	102.4
Cheboygan	6,911	0	....	6,790	45	662.7
Coldwater	6,232	37	593.7	6,227	.7	11.2
Detroit	349,674	177	50.6	328,114	48	14.6
Escanaba	12,260	0	....	11,485	20	174.1
Flint	16,220	6	37.0	15,329	12	78.3
Grand Haven	5,611	0	....	5,363	16	298.3
Grand Rapids	101,833	20	19.6	97,756	102	104.3
Hancock	7,527	0	....	6,534	0	....
Hillsdale	5,303	9	169.7	4,974	5	100.5
Holland	9,848	1	10.2	9,260	16	172.8
Houghton	5,086	0	....	4,592	0	....
Ionia	5,232	5	95.6	5,225	2	38.3
Iron Mountain	8,092	0	....	8,421	1	11.9
Ironwood	10,255	0	....	10,098	0	....
Ishpeming	10,399	0	....	11,215	0	....
Jackson	25,390	1	3.9	25,330	38	150.0
Kalamazoo	33,816	7	20.7	31,127	18	57.8
Lansing	23,119	4	17.3	21,224	29	136.6
Laurium	9,161	0	....	8,156	0	....
Ludington	7,329	16	218.3	7,282	6	82.4
Manistee	11,544	115	996.2	12,320	1	8.1
Marquette	11,120	0	....	10,817	.3	2.8
Menominee	9,805	1	10.2	10,666	1	9.4
Monroe	6,942	16	230.5	6,399	.3	4.7
Mt. Clemens	7,507	8	106.6	7,241	2	27.6
Mt. Pleasant	5,101	2	39.2	4,690	6	127.9
Muskegon	20,956	1	4.8	20,917	8	38.2
Negaunee	6,694	0	....	6,763	.7	10.4
Norway	5,385	0	....	5,038	2	39.7
Owosso	9,482	0	....	9,257	28	302.5
Petoskey	5,112	10	195.6	5,161	7	135.6
Pontiac	11,720	3	25.6	11,163	5	44.8
Port Huron	20,681	0	....	20,246	2	9.9
Saginaw	49,809	77	154.6	47,676	111	232.8
St. Joseph	5,447	2	36.7	5,364	0	....
Sault Ste. Marie	12,120	4	33.0	11,668	5	42.9
Traverse City	12,610	12	95.2	11,695	18	153.9
Wyandotte	5,607	0	....	5,486	3	54.7
Ypsilanti	7,744	2	25.8	7,639	11	144.0

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* Estimated for intercensal years.

† Does not include West Bay City for 1904, which was consolidated with Bay City in 1905.

THE REPORTED SOURCES OF CONTAGIUM IN SMALLPOX.

Table 76 indicates that in but twenty-four per cent of the outbreaks of smallpox which occurred in 1907 was the source of the contagium traced and reported to this Department. It may be seen that seventy-five per cent of the outbreaks in which the source was traced were due to the movement, from one locality to another, of persons suffering from or who had been exposed to smallpox. In very many instances, the disease was so mild that the patients did not call in a physician, or take to their beds, and, in this way, many of them were enabled to move about from place to place wthout let or hindrance on the part of the local health officials.

The places from which and to which smallpox was spread in 1907 are shown in Table 77.

TABLE 76.—*The reported sources of contagium in smallpox, in Michigan, in the two years, 1906–1907, as indicated by the number and per cent of instances in which each of the given sources was responsible for the introduction of the disease into a household.*

Sources.	Number of instances.	Per cent of all instances in which a source was given.
Outside jurisdictions	247	75
Traced to former cases in same jurisdictions	79	24
Infected clothing, mail, etc	5	1
Not stated, or statements doubtful	1,052	*76

* Per cent of all households in which smallpox occurred.

TABLE 77.—*Localities from which and to which smallpox was spread, during the year 1907.*

Spread from:	To:	Spread from:	To:
Baraga County Baraga Village.	Houghton County, Laird Township.	Genesee County, Montrose Township.	Saginaw County, Taymouth Township.
Berrien County, Eau Claire Village.	Berrien County, Pipestone Township.	Gratiot County, Washington Township.	Gratiot County, Elba Township.
Branch County, Coldwater City.	Branch County, Bronson Village.	Hillsdale County, Woodbridge Township.	Hillsdale County, Hillsdale City.
Branch County, Coldwater City.	Branch County, Ovid Township.	Ingham County, Lansing City.	Ingham County, Delhi Township.
Branch County, Coldwater City.	Branch County, Quincy Township.	Ionia County, Belding City.	Kent County, Gratton Township.
Branch County, Union City Village.	Jackson County, Jackson City.	Ionia County, Ionia City.	Genesee County, Montrose Township.
Calhoun County, Clarence Township.	Eaton County, Hamlin Township.	Ionia County, Ionia Township.	Ionia County, Orleans Township.
Calhoun County, Clarence Township.	Jackson County, Springport Township.	Isabella County, Mt. Pleasant City.	Washtenaw County, Ann Arbor City.
Calhoun County, Marengo Township.	Eaton County, Walton Township.	Isabella County, Nottawa Township.	Clare County, Garfield Township.
Chippewa County, Sault Ste. Marie City.	Schoolcraft County, Mueller Township.	Isabella County, Nottawa Township.	Isabella County, Deerfield Township.
Eaton County, Eaton Rapids City.	Hillsdale County, Somerset Township.	Isabella County, Nottawa Township.	Isabella County, Gilmore Township.
Emmet County, Petoskey City.	Emmet County, Bear Creek Township.	Isabella County, Nottawa Township.	Isabella County, Isabella Township.
Emmet County, Resort Township.	Emmet County, Petoskey City.	Isabella County, Nottawa Township.	Isabella County, Mt. Pleasant City.
Genesee County, Clio Village.	Oakland County, Highland Township.	Jackson County, Jackson City.	Eaton County, Eaton Rapids Township.
Genesee County, Fenton Village.	Livingston County, Deerfield Township.	Jackson County, Springport Village.	Branch County, Union City Village.
Genesee County, Flint City,	Clinton County, Bingham Township.	Jackson County, Springport Village.	Calhoun County, Clarence Township.

TABLE 77.—CONTINUED.

Spread from:	To:	Spread from:	To:
Jackson County, Springport Village.	Calhoun County, Marengo Township.	Mason County, (No locality given.)	Oceana County, Levitt Township.
Jackson County, Springport Village.	Jackson County, Parma Township.	Menominee County, Ingallston Township.	Menominee County, Menominee City.
Jackson County, Springport Village.	Jackson County, Tompkins Township.	Monroe County, Monroe City.	Monroe County, Frenchtown Township.
Kent County, Grand Rapids City.	Barry County, Thornapple Township.	Montcalm County, Sidney Township.	Montcalm County, Evergreen Township.
Kent County, Grand Rapids City.	Ionia County, Muir Village.	Oakland County, Holly Village.	Oakland County, Groveland Township.
Kent County, Grand Rapids City.	Ottawa County, Coopersville Village.	Oakland County, Holly Village.	Oakland County, Holly Township.
Kent County, Grand Rapids City.	Ottawa County, Georgetown Township.	Oakland County, Holly Village.	Oakland County, White Lake Township.
Kent County, Grand Rapids City.	Ottawa County, Zeeland Township.	Oakland County, Pontiac City.	Oakland County, Independence Township.
Keweenaw County, (No locality given.)	Houghton County, Calumet Township.	Oakland County, Rose Township.	Oakland County, Highland Township.
Lapeer County, Imlay City Village.	St. Clair County, Mussey Township.	Oceana County, Leavitt Township.	Oceana County, Benona Township.
Leelanau County, Kasson Township.	Benzie County, Platte Township.	Oceana County, Leavitt Township.	Oceana County, Colfax Township.
Manistee County, Manistee City.	Manistee County, Filer Township.	Oceana County, Leavitt Township.	Oceana County, Elbridge Township.
Manistee County, Manistee City.	Manistee County, Manistee Township.	Oceana County, Leavitt Township.	Oceana County, Newfield Township.
Manistee County, Manistee City.	Osceola County, Hersey Township.	Oceana County, Newfield Township.	Newaygo County, Denver Township.
Mason County, Ludington City.	Mason County, Amber Township.	Oceana County, (No locality given.)	Wexford County, South Branch Township.

TABLE 77.—CONTINUED.

Spread from:	To:
Osceola County, Evart Village.	Osceola County, Orient Township.
Otsego County, Denver Township.	Otsego County, Bagley Township.
Saginaw County, Saginaw City.	Bay County, Frankenlust Township.
Saginaw County, Saginaw City.	Isabella County, Coe Township.
Saginaw County, Saginaw City.	Tuscola County, Vassar Village.
St. Joseph County, Centerville Village.	St. Joseph County, Florence Township.
St. Joseph County, Sturgis City.	Branch County, Coldwater City.
St. Joseph County, Sturgis City.	Branch County, Noble Township.
St. Joseph County, Sturgis City.	St. Joseph County, Burr Oak Township.
Sanilac County, Delaware Township.	Sanilac County, Marion Township.
Tuscola County, Caro Village.	Lapeer County, Clifford Village.
Tuscola County, Ellington Township.	Huron County, Sebewaing Township.
Tuscola County, Kingston Township.	Tuscola County, Koylton Township.
Van Buren County, Keeler Township.	Berrien County, St. Joseph City.
Van Buren County, Keeler Township.	Cass County, Dowagiac City.
Washtenaw County, Ypsilanti City.	Hillsdale County, Woodbridge Township.
Wayne County, Detroit City.	Kalamazoo County, Kalamazoo City.
Wayne County, Detroit City.	Oakland County, Leonard Village.
Wayne County, Detroit City.	Oakland County, Rochester Village.
Wayne County, Detroit City.	Oakland County, White Lake Township.

FROM OUTSIDE THE STATE TO LOCALITIES IN MICHIGAN.

Spread from:	To:
Canada, (No locality given.)	Branch County, Sherwood Township.
Georgia, (No locality given.)	Bay County, Bangor Township.
Illinois, Chicago.	Ingham County, Lansing City.
Illinois, (No locality given.)	St. Joseph County, Burr Oak Township.
Illinois, Odell.	St. Joseph County, Burr Oak Village.
Indiana, Elkhart.	St. Joseph County, Sturgis City.
Indiana, (No locality given.)	Lake County, Lake Township.
Indiana, South Bend.	St. Joseph County, Centerville Village.
Indiana, South Bend.	St. Joseph County, Florence Township.
Indiana, South Bend.	St. Joseph County, Lockport Township.

TABLE 77.—CONCLUDED.

Spread from:	To:	Spread from:	To:
Minnesota, Duluth.	Calhoun County, Homer Village.	South Dakota, (No locality given.)	Van Buren County, Keeler Township.
Minnesota, Duluth.	Chippewa County, Sault St. Marie City.	Texas, (No locality given.)	Eaton County, Charlotte City.
Minnesota, Duluth.	Montcalm County, Sidney Township.	Washington, Spokane.	Kent County, Grand Rapids City.
Minnesota, (No locality given.)	Alcona County, Haynes Township.	Wisconsin, Baraboo.	Van Buren County, South Haven Township.
Minnesota, (No locality given.)	Gratiot County, Lafayette Township.	Wisconsin, Fondulac.	Branch County Coldwater City.
Ohio, (No locality given.)	Cheboygan County, Forest Township.	Wisconsin, West Superior.	Chippewa County, Sault Ste. Marie City.

RESTRICTIVE AND PREVENTIVE MEASURES IN SMALLPOX.

Placarding, isolation and disinfection.—Table 78 indicates that, in but seventy-three per cent of all households in which smallpox occurred in 1906-7 were the restrictive measures of placarding, isolation and disinfection enforced. This may be partly accounted for by the fact that, in many instances, owing to the mild character of the disease, the health officer was not satisfied as to the true character of the disease, or was not notified in time to institute these restrictive measures, particularly those of placarding and isolation. In nearly every outbreak investigated by this Department since the present mild type of smallpox became widespread, in which the nature of the disease was in doubt, the disease has proved to be smallpox; and very many cases of smallpox might have been prevented in each year if the health officers had adopted the policy of giving the public the benefit of the doubt by the prompt institution of restrictive measures.

Vaccination of sick persons.—Table 78 indicates that sixty-five, and possibly eighty-six, per cent of all the persons sick from smallpox in 1906-7 had not been vaccinated, and emphasizes the well known and universally accepted fact of the immunity conferred by vaccination. This section of Table 79 may well be studied in connection with Table 79A, in which is shown the periods of time which elapsed between vaccination and sickness from smallpox, in certain instances, in the years 1904-1907.

TABLE 78.—*Restrictive and preventive measures in smallpox, in Michigan, in the two years, 1906–1907.*

Restrictive and preventive measures.	Number.	Per cent of all cases or households.
PLACARDING, ISOLATION AND DISINFECTION:		
Households in which enforced	1,009	73
Neglected	141	10
Not stated, or statements doubtful	233	17
VACCINATION OF SICK PERSONS:		
Cases vaccinated at commencement of or prior to sickness*	406	14
Not vaccinated	1,929	65
Not stated, or statements doubtful	617	21

*The time of vaccination of sick persons in 1904–1907 is shown in Table 78A.

TABLE 78A.—*The time which elapsed between previous vaccination and the beginning of sickness in smallpox patients, in Michigan, in the four years, 1904–1907.**

Time	Same day.	1 day.	3 days.	5 days.	7 days.	10 days.	14 days.	21 days.	1 Mo.	2 Mos.	1 yr.	2 yrs.	3 yrs.
No. of cases	55	6	9	8	6	3	1	2	4	1	19	116	57
Time	4 yrs.	5 yrs.	6 yrs.	7 yrs.	8 yrs.	9 yrs.	10 yrs.	11 yrs.	12 yrs.	13 yrs.	14 yrs.	15 yrs.	16 yrs.
No. of cases	43	37	21	9	3	3	12	1	4	2	1	6	3
Time	17 yrs.	20 yrs.	21 yrs.	24 yrs.	25 yrs.	26 yrs.	30 yrs.	31 yrs.	35 yrs.	40 yrs.	45 yrs.	50 yrs.	53 yrs.
No. of cases	1	41	2	1	7	3	12	1	2	8	1	4	1
Time	55 yrs.	60 yrs.	1–2 yrs.	1–10 yrs.	2–10 yrs.	2–40 yrs.	3–4 yrs.	3–13 yrs.	3–20 yrs.	3–45 yrs.	5–25 yrs.	6–8 yrs.	7–8 yrs.
No. of cases	1	3	1	1	5	24	1	4	8	3	1	1	2
Time	7–18 yrs.	8–15 yrs.	10–12 yrs.	10–14 yrs.	10–15 yrs.	12–14 yrs.	15–20 yrs.	20–25 yrs.	20–30 yrs.	30–40 yrs.			
No. of cases	1	1	9	2	8	3	1	2	1	1			

* There were 397 cases, not included in this Table, which had been vaccinated prior to the sickness from smallpox, but in which the time of vaccination was indefinite or not stated.

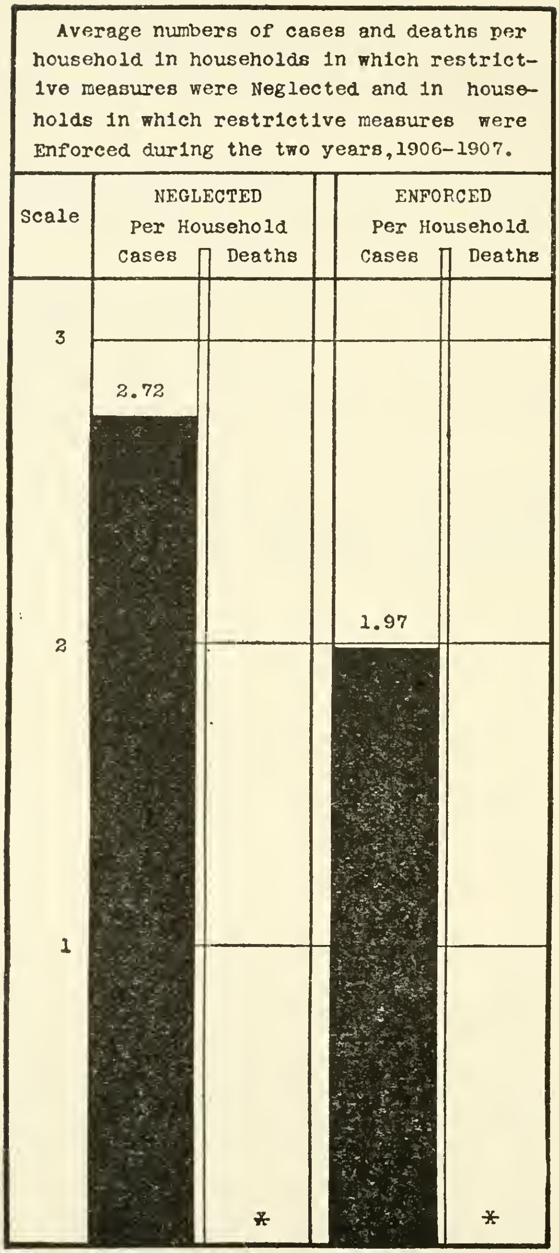
Results of restrictive measures.—Table 79 and accompanying diagram are somewhat similar to tables and diagrams, relative to the results of restrictive measures in smallpox, in the annual reports of this Department ending with 1904, the principal difference being that the disease is now studied by *households* instead of *outbreaks.* It is believed that, with the continuation of the table for a number of years, a much better, and certainly a much more reliable, showing can be made than in the preceding reports.

TABLE 79.—*Showing the total number of households in which smallpox was present during the two years, 1906–1907, together with the total number of cases and deaths and the average number of cases in each household in which the restrictive measures were enforced or neglected.*

	Total number of households, 1,383.		Restrictive measures enforced in 1,009 households.		Restrictive measures neglected in 141 households.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals	2,952	11	1,984	10	384	0
Average number per household	2.13	*	1.97	*	2.72	0

* The average deaths per household are too small to be considered.

SMALLPOX RESTRICTED
BY ISOLATION AND DISINFECTION.



Average numbers of cases and deaths per household in households in which restrictive measures were Neglected and in households in which restrictive measures were Enforced during the two years, 1906-1907.

* The average deaths per household are too small to be considered.

[Plate 1288.]

CHICKEN-POX (VARICELLA) IN MICHIGAN IN 1907.

During the year ending December 31, 1907, chicken-pox was reported present in 124 households, in 26 localities, in the State, with a total of 177 cases, including 1 death.

So far as is known, the restrictive measures of isolation and disinfection were fully carried out in but 39 of the 177 cases, but this is a vast improvement over the preceding years.

Whenever an outbreak of chicken-pox occurs in the State, the following letter is sent to the health officer of that jurisdiction:

> "I am informed that chicken-pox is present in your jurisdiction.
>
> "Many times smallpox has been diagnosed as chicken-pox, and not infrequently physicians have insisted that cases of smallpox were chicken-pox. There has long been trouble of this kind, but the mildness of smallpox recently has made this error more common than formerly.
>
> "By this mail I send you copies of the pamphlet issued by this Board, 'Vaccination and Revaccination,—The Prevention of Smallpox,' and because smallpox is so often diagnosed as chicken-pox, all persons exposed to such a disease should be vaccinated; it is a reasonable precaution, and the public health interests should be given the benefit of every doubt.
>
> "Children having chicken-pox should not be allowed to attend school, they should be promptly isolated until it is proved beyond a doubt that it is not smallpox.
>
> "It should be remembered that adults seldom have chicken-pox, therefore an eruption, especially a papular eruption, becoming vesicular, occurring in a person over ten or twelve years of age, should be regarded as probable smallpox, and the same precautions should be taken as in cases of recognized smallpox, until some competent authority has decided that it is not smallpox.
>
> "This Board has not yet issued a printed leaflet relative to chicken-pox, but because of the above-mentioned reasons it is recommended that every case of chicken-pox be reported to the local health officer, and that prompt action be taken by him to restrict the disease, and to report the facts to the Secretary of the State Board of Health."

MUMPS (PAROTITIS) IN MICHIGAN IN 1907.

During the year 1907, twelve cases of mumps (parotitis) were reported from five localities in this State. No deaths were reported from this disease.

ERYSIPELAS IN MICHIGAN IN 1907.

During the year 1907, reports were received relative to 109 cases of erysipelas, in the State, 102 of which proved fatal.

So far as could be learned, there was no connection between these cases and any of the cases of puerperal fever reported to this Department.

PUERPERAL FEVER IN MICHIGAN IN 1907.

During the year 1907, 108 deaths from puerperal fever were reported, but this number must not be taken as including all the cases of puerperal fever which occurred in the State in that year, because the reports of this disease are very meager, and, as a rule, first information of cases of the disease are obtained from the deaths returned to the Secretary of State.

ITCH (SCABIES) IN MICHIGAN IN 1907.

During the year 1907, but one outbreak of itch was reported as compared with thirteen outbreaks in the preceding year.

Many communications are received from health officers and from school officials asking for information relative to their respective duties in regard to this disease, and the following extract from a letter from this Department may be taken as representative of the advice given by this department.

> "* * * * * * * * * inasmuch as itch is a communicable disease, children having it should be excluded from the public schools, and this should be done by the school board and local board of health acting in harmony for the good of all concerned. * * * * * *
>
> "* * * * * * * * * in numerous instances during the past, outbreaks of the mild form of smallpox have at first been called scabies and not reported, and the disease has thus been allowed to spread, therefore this Department feels warranted in urging health officers to thoroughly investigate all eruptive diseases and be sure that it is not the mild form of smallpox."

TETANUS (LOCK-JAW) IN MICHIGAN IN 1907.

During the year 1907, there were reported to this Department, from twenty-six localities in this State, thirty cases of tetanus, all of which terminated fatally.

Of the twenty-four cases in which a source of infection was reported four cases were due to wounds from rusty nails; three to gunshot wounds, two to injury to foot, two to injury by forks, and one each to the following causes:

Fracture of arm; head and fingers crushed by cogwheel; injury and infection around nail on hand, probably due to working on a sanding machine; slight bite in face by dog; burn; blank cartridge; kick by a horse; cold sore on lip and nose; malnutrition; wound in ankle; varicose ulceration of leg; wound by common firecracker; and cut by glass.

In six instances, the average period of incubation (from the time of the wound or injury until tetanus developed) was 10 days.

In twenty-one instances, the average duration of the sickness (from the time tetanus developed until death occurred) was 5.1 days.

The averages of the ages of all the cases were: for males, 18.8 years, and for females, 32.0 years.

In Part 1 of this annual report is printed a statement relative to the efforts put forth by this Department during the fiscal year 1908 for the prevention of tetanus.

DYSENTERY IN MICHIGAN IN 1907.

During the year 1907, 105 deaths from dysentery were reported to this Department by the Secretary of State, but no information was received from the health officers of any of the localities in which the cases occurred relative to the probable sources of the disease.

DISEASES OF ANIMALS, DANGEROUS TO MAN, IN MICHIGAN, IN 1907.

Whenever information is received at this office of the occurrence of an outbreak of any disease of animals, which, by reason of its communicability, may be considered dangerous to man, efforts are made to learn all facts relative to such outbreaks. The matter is reported to the State Live Stock Sanitary Commission, and the attention of the health officials of the locality where the disease is reported present is called to the fact of its reported prevalence, and they are requested to take immediate measures for the prevention of its spread, by establishing and maintaining quarantine over the diseased animals, until relieved by the State Live Stock Sanitary Commission.

During the year 1907, outbreaks of anthrax in sheep; glanders (farcy) in horses; and rabies (hydrophobia) in mankind and in animals, were reported to this office from various parts of the State, a brief statement relative to the most important of which follows:

ANTHRAX IN MICHIGAN IN 1907.

In December, 1907, the Secretary of State reported to this Department the death of a farmer, 51 years old, from anthrax, in Wyoming township, Kent county. No further particulars were received relative to this case.

GLANDERS (FARCY) IN A HORSE IN MICHIGAN IN 1907.

During the year 1907, one outbreak of glanders in a horse was reported from Martin township, Allegan county.

The following is a sample of the advice given by this Department upon the receipt of information relative to an outbreak of glanders:

"Relative to glanders, the case should at once be reported to the State Live Stock Sanitary Commission, and the health officer of the jurisdiction in which the case occurs is expected to take charge of the case until some member of the commission relieves him. Meanwhile it is very important, since the disease is dangerous to man and to animals, to isolate the animal supposed to be diseased, and to take every precaution until the commission or some member thereof shall relieve the local board of health of the charge.

RABIES (HYDROPHOBIA) IN MICHIGAN IN 1907.

During the year 1907, there were reported to this office two deaths from rabies in the same number of localities in the State. One of the cases was that of a farmer in Fremont township, Saginaw county, and the other a child, three years old, in Grand Rapids city. No particulars, other than those contained in the death certificates, were received relative to these cases.

The following general instructions have been sent to health officers, and other interested persons, in localities where rabies was reported present:

MUZZLE ALL DOGS AT LARGE.

The State Board of Health advises every local board of health in Michigan to immediately make and publish regulations ordering the muzzling of all dogs at large and the killing of all unmuzzled dogs found at large, and to make provision for the prompt and effective execution of such regulations.

Local boards of health have full power to make such regulations which, when published, have the force of law, the violation of which is a misdemeanor. This power or authority is implied, and is also given by statute in Michigan, in townships by Sections 4412 and 4413, Compiled Laws of Michigan, 1897; and these sections are made to apply in cities and villages by Sec. 4459, excepting in cases where the charters of such cities and villages contain provisions inconsistent therewith.

The section of law specifying the manner of the publication is as follows:

"Sec. 4416. Notice shall be given by the board of health of all regulations made by them, by publishing the same in some newspaper of the township, if there be one published therein, and if not, then by posting them up in five public places in such township; and such notice of said regulations shall be deemed legal notice to all persons."

The following form is recommended:

OFFICIAL PUBLIC NOTICE BY THE BOARD OF HEALTH. REGULATIONS FOR THE PREVENTION OF HYDROPHOBIA, BY THE RESTRICTION OF RABIES.

Whereas, Rabies is widely disseminated and is epidemic in Michigan; and

Whereas, The State Board of Health has recommended that municipal and township authorities order the muzzling of all dogs at large, and make and publish regulations to that effect;

Resolved, That the local board of health of the township [city or village] of ...., county of ...., State of Michigan, hereby makes and publishes the following regulation:

All dogs, male or female, not effectually muzzled, running at large on any street, alley or public grounds, or private premises, not the premises of the owner or keeper thereof, may be killed by any person; and it shall be the duty of every constable [policeman, or other peace officer] of the said township [city, or village] and he is hereby ordered to kill any and all such dogs.

[Name of place and date.] Attest.

....

Clerk of the Board of Health.

MAD DOGS.—WHAT TO DO WITH AN ANIMAL SUPPOSED TO BE RABID.

If it is certain that the supposed rabid animal has not bitten any person or animal. it may properly be killed and buried where no other animal may gain access to it.

Whenever a person has been bitten by a dog which there is reason to believe is infected with rabies, or a part of his body of which the skin is in any way broken is brought in contact with saliva from such dog, he or she should promptly go or be sent to a Pasteur Institute for treatment until it is determined whether or not the dog was so infected.

When an animal has been bitten by a dog supposed to be rabid (commonly said to be "mad" or to have "hydrophobia"), it is desirable, and when a person has been so bitten it is important that the fact be established whether or not the dog is rabid. Because, if it is known to be rapid, there may then be time for the person bitten to undergo preventive inoculation or other treatment; while if the dog is proved not to have had rabies such trouble may be prevented, as also the extremely painful anxiety which otherwise would long continue. It is now possible to learn whether or not an animal is rabid.

If practicable, without danger of some person being bitten, the dog or other animal supposed to have rabies should not be killed, but be very securely confined, in such manner that it is not possible for it to bite any person or animal. *If the dog is rabid it will die within eight days.* If it does not, it is proof that it was not rabid. If it dies, the animal was probably rabid, and in that event, as also if the animal has been killed, the upper portion of the spinal cord and adjacent part of brain should be placed in a sterilized bottle with a glass stopper, the bottle then filled with twenty per cent solution of pure glycerine, and the whole sent by express or special messenger to the Director of the State Laboratory of Hygiene, Ann Arbor, with request for an immediate biological test for rabies, and a report of the result. Such investigations are made there at cost.

A person bitten by an animal supposed to be rabid should very promptly consult a physician; and without waiting for the physican should employ all practicable means for dislodging from the wound any germs of virus which may have entered there; washing the wound freely with boiled water, and by means of a syringe if possible.

Rabies is a "disease dangerous to the public health" and as such should be promptly reported to the health officer, and promptly restricted by him in accordance with Act 137, Laws of 1883, and other laws relating to the public health. If the disease occurs in an animal, the health officer or local board should also, in compliance with Sections 5 and 6, Act No. 125, Laws of 1889 (C. L. 1897, Sections 5631 and 5632), promptly report the fact to the State Live Stock Sanitary Commission,—the guardians of the safety of animals; but under no circumstances should the local health authorities fail to guard the public health and life from this fearful disease.

Animals bitten by a supposed rabid dog should be promptly isolated by the local board of health and kept thus until the State Live Stock Sanitary Commission shall have been informed of the facts and takes charge of the animal or animals, thereby relieving the local board of health. This is required by Section 6, Act 125, Laws of 1899 (Section 5632, C. L. 1897). Whether in man or animal, the disease should be promptly reported to the State Board of Health.

The following well written article on Rabies was clipped from the Lansing State Republican of August 23, 1907, but the authorship cannot be learned. The statements in the article are true and correct in the light of our present knowledge of the disease.

CURE CERTAIN IF TREATMENT PROMPT.

HYDROPHOBIA IS A MALADY OF BOTH MAN AND BEAST.

TERRORS OF RABIES

CAUSED BY SMALL ORGANISMS AND PROGRESSES ALONG INVARIABLE LINES.

There are still found here and there doctors who deny the existence of hydrophobia as a disease, and declare that its victims die of fright merely.

As a matter of fact hydrophobia is just as real as diphtheria or tuberculosis, and its existence is just as easily demonstrated. It is caused by some small organism and it progresses along invariable lines. When once its symptoms are fully developed it is absolutely and utterly fatal.

In all the literature of medicine there is no trustworthy record of a cure. But fortunately it develops slowly, and if treatment is begun within a reasonable time there is no reason why the symptoms should develop at all.

Hydrophobia is a malady of both man and beast. Dogs, wolves, cats, cattle, rabbits, monkeys and nearly all other mamals suffer from its ravages. As a rule it appears in the human subject as the result of a bite from some domestic animal—usually a dog.

Pasteur, after long experiments, found that the infected spinal cord of an animal killed by hydrophobia had the power of producing the disease in healthy animals, but that this power gradually disappeared. For example, if an emulsion be made of the spinal cord of a rabbit which had just died of rabies and that emulsion be injected into a healthy rabbit, the latter will invariably develop the malady and die.

If, however, the spinal cord of the first rabbit be kept for a day or a week before the emulsion is made, there will appear more and more chances in favor of the second rabbit's recovery. In other words, it is possible so to attenuate and weaken virulent organisms, even those of hydrophobia, that they become less and less harmful and finally entirely harmless.

This attenuation may be accomplished by various means, but in practice it has been found most satisfactory to depend upon the beneficent operation of time. The spinal cords of rabbits dead of the disease are cut into small pieces and suspended in sterile glass jars over caustic potash, which absorbs moisture, and kept at a uniform temperature of 22 degrees centigrade.

A cord removed at the end of 48 hours is just a shade less infective than it was when taken from the carcass. A cord removed at the end of 15 days has lost its power of infection entirely.

This process of immunization consists in fortifying the human patient during the period of incubation with inoculation of virus of gradually increasing activity. On the first day of the treatment the patient is inoculated with an emulsion from a 15-day cord. This, being practically inert, does not injure him.

Next day he gets an injection of a 13-day cord. Then as a man vaccinated develops an exceedingly mild attack of cowpox, just so this hydrophobia patient develops an exceedingly mild attack of rabies. It is so mild, indeed, that he doesn't notice it. He may go about his business and mingle with his fellows as if nothing were wrong with him.

On the third day there follows an injection of the eleventh-day cord, which contains the hydrophobia organisms in pretty healthy condition. But the 13-day cord has produced a certain immunity already and the patient does not grow ill. On successive days injections are made of emulsions of more and more active cords.

Finally the patient receives an injection from a 48-hour cord. If he had received it on the first day it would have killed him out of hand, but by this time his body has acquired a gradually increasing power of resistance to the hydrophobia organism. In brief, he has been vaccinated against rabies.

ALLEGED NUISANCES IN MICHIGAN IN 1907.

During the year 1907, communications relative to eighty-six alleged nuisances in Michigan were received at the office of the State Board of Health.

The causes to which the alleged nuisances mentioned in these communications were attributed, may be classified as follows:

Unburied and insufficiently buried dead animals, 13; slaughter houses, 11; refuse dumped on the ground, 9; waste from cider mills, paper factories, pickle factory and creamery, 7; closets, 6; stagnant water, 6; barnyard and manure heaps, 5; insanitary houses, 5; cesspools, 4; emptying of sewers on private premises, 4; open drains, 3; pig pens, 3; pollution of streams, 3; sewers, 2; filthy person, 1; insanitary conditions of a camp of Italians, 1; fat rendering on the street, 1; refuse from meat market, 1; enclosed dogs, 1.

Whenever complaint of an alleged nuisance is received at this office, the president of the local board of health whose duty it is to act, is usually informed of the nature of the nuisance, and is requested to investigate the same. At the same time the sections of law, and pamphlet publications of this Board pertaining to nuisances and to the duties of local boards of health relative thereto, are sent to him and also to the person making complaint. Two regular forms of letters are used for this purpose. The first is sent to the person making complaint of the nuisance, the other is sent to the president of the board of health of the locality where the nuisance is reported to exist.

In articles on alleged nuisances, published in previous annual reports of this Board, attention was called to the fact that a large proportion of the communications received at this office in regard to alleged nuisances came from local health officers and other township, city and village officials asking for information relative to points of law concerning nuisances, or requesting advice as to their duties, or to the proper legal procedure necessary to effect the prevention or abatement of nuisances. The correspondence of 1907, shows a continued desire on the part of the local health officials for advice and cooperation of this Board, which has been freely and cheerfully given, and it is believed with results beneficial to the public health.

The State Board of Health has no authority to enforce or order the abatement of a nuisance. Its powers in this respect are advisory. And while the board is willing to render such advice as it may be able to give on any subject, it is often the case in regard to nuisances, that prosecuting attorneys or other lawyers on the ground and acquainted with the facts, are in better position to give legal advice than is the office of the State Board of Health. The Secretary of the State Board of Health is always glad to learn of the efforts of local boards to abate nuisances, and what success attends those efforts, and solicits correspondence upon this subject. However, the State Board of Health cannot undertake to do for local boards that which the law has so well provided for their doing for themselves. In showing them how they can help themselves it really does more for them than to do their work; for when the local board has mastered the situation and removed a nuisance, it has secured a vantage ground which a distant authority could not so well secure and hold.

INDEX

INDEX—REPORT FOR 1908.

Page.

- Almont, inspection of school building at 40–41
- Anthrax, in Michigan, in 1907 211
- Antitoxin (see Diphtheria).

- Bacteriological laboratory, rules and regulations for 11–12
- Basement rooms in schools, opinion relative to the use of for class purposes 52
- Board of Health, State, annual reports of the 32
  - expenditures by the 81–82
  - general work and expenditures in office of 30–82
  - members of the 5
  - movements of the secretary of 35–37
  - regular and special meetings of 9–12
  - report relative to the equipment of and work in the laboratory of the 52–74
  - school work of the 34–35
  - special investigations by the sanitary engineer of 37–52
- Boards of education, advice to 35–51
  - health, local, advice to 35–52
- Buchanan, inspection of high school at 50
  - inspection relative to sewerage at 49–50
- Bulletins, "Public Health, Michigan," fiscal year 1908 33–34

- Central State Normal School, examination of plans for physical training building at 25
- Chicken-pox (Varicella) in Michigan in 1907 209
- Cleaning-up day 78–79
- Communicable diseases (indexed "Diseases, Communicable").
- Compilation, methods of 88
- Corunna, examination of plans for new school building at 51

- Deaths in Michigan, 1898–1907, diagram of 87
- Diagram, diphtheria restricted by isolation and disinfection 159
  - scarlet fever restricted by isolation and disinfection 177
  - smallpox restricted by isolation and disinfection 208
- Diphtheria, in Michigan, antitoxin treatment in 160
  - general prevalence of 147–149
  - geographical distribution of 149–151
  - in 1907 and preceding years 147–160
  - prevalence of in urban and rural localities 151–153
  - restrictive and preventive measures in 157–159
  - sources of contagium in 154
  - spread from one locality to another 155–157
  - particulars relative to bacteriological diagnosis of 57–61
- Diseases, communicable, in Michigan, in 1907 and preceding years 87–215
  - physicians' report of 89
  - of animals, dangerous to man, in Michigan in 1907 211
- Dogs at large, muzzle all 212
- Drowned, placards relative to the resuscitation of the 79
- Dry earth closet, for schoolhouse, advice relative to construction of 42
  - closets, plans for 43
- Dysentery, in Michigan, in 1907 211

- Eastern Michigan Asylum, examination of plans for a new chapel and assembly hall building for 18
  - visit of the sanitary engineer to 46

Page.

- Embalmers, examination and licensing of ... 28–29
  - examinations, resolution relative to ... 9
- Erysipelas, in Michigan, in 1907 ... 209
- Examination and licensing of embalmers ... 28–29
  - of plans for State buildings ... 13–28

- Farcy (indexed "Glanders").
- Fever, puerperal, in Michigan in 1907 ... 210
  - scarlet, in Michigan, general prevalence of ... 167–168
    - geographical distribution of ... 168–170
    - in 1907 and preceding years ... 167–178
    - prevalence of in urban and rural localities ... 170–172
    - restrictive and preventive measures in ... 176–178
    - sources of contagium in ... 173
    - spread from one locality to another ... 174–175
  - typhoid, in Michigan, campaign against ... 74–78
    - general prevalence of ... 131–133
    - geographical distribution of ... 133–136
    - in 1907 and preceding years ... 131–147
    - prevalence of in urban and rural localities ... 136–138
    - restrictive and preventive measures in ... 145–146
    - sources of contagium in ... 138–140
    - spread from one locality to another ... 141–144
    - history of outbreaks on the Great Lakes ... 146–147
    - particulars relative to bacteriological diagnosis of ... 62–65
- Firearms and fireworks, dangerous ... 80
- Floors, cleaning of ... 80–81

- Glanders (Farcy) in horses, in Michigan, in 1907 ... 211–212

- Hartford, inspection relative to drainage and sewerage at ... 50–51
- Hydrophobia (indexed "Rabies").

- Imlay City, advice relative to the disposal of sewage at ... 49
  - inspection of school building at ... 39–40
- Immigrants, possibly exposed to communicable diseases and destined to settle in Michigan 34
- Information, collection of ... 30–31
  - dissemination of ... 31–35
- Ionia, inspection of school buildings at ... 46–48
- Itch (Scabies) in Michigan in 1907 ... 210

- Laboratory, bacteriological, rules and regulations for ... 11–12
  - examinations, miscellaneous ... 71–74
  - of the State Board of Health, report relative to the equipment of and work in 52–74
- Lock-jaw (indexed "Tetanus").

- Mad dogs (see "Rabies").
- Measles, in Michigan, general prevalence of ... 179
  - geographical distribution of ... 180–182
  - in 1907 and preceding years ... 178–194
  - restrictive and preventive measures in ... 191–194
  - sources of contagium in ... 183
  - spread from one locality to another ... 184–191
- Meningitis, in Michigan, duration of sickness in ... 130
  - general prevalence of ... 121–122
  - geographical distribution of ... 123–125
  - in 1907 and preceding years ... 121–131
  - influence of age and sex in ... 129
  - prevalence of in urban and rural localities ... 125–127
  - restrictive and preventive measures in ... 130–131
  - seasonal prevalence of ... 127–128
  - sources of contagium and predisposing influences in ... 128–129
  - tubercular and traumatic, 1899–1907 ... 123
- Michigan College of Mines, examination of plans for a new power house, service tunnel and library building for ... 16, 25–27
- Michigan Home for Feeble-Minded and Epileptic, examination of plans for new buildings at ... 21–24
  - inspection of buildings at ... 44–46

Page.
Mumps (Parotitis) in Michigan in 1907 209

Neostyle work, summary of 32-33
Northern State Normal School, examination of plans for central heating plant at 25
Nuisances, alleged, in Michigan in 1907 215-216

Parotitis (indexed "Mumps").
Physicians' report of dangerous communicable diseases 89
Plans for State buildings, examination of 13-28
Pneumonia, in Michigan, duration of sickness in 98-99
    general prevalence of 91
    geographical distribution of 91-93
    in 1907 and preceding years 90-105
    influence of age and sex in 96-97
    influence of occupation in 102-104
    period of incubation in 101-102
    predisposing influences in 100-101
    prevalence of in urban and rural localities 93-95
    restrictive and preventive measures in 104-105
    seasonal prevalence of 95-96
    sources of contagium in 101
  letter of Secretary relative to the communicability of 90-91
Postal laws and regulations relative to mailing specimens for bacteriological examination 53-54
Puerperal fever (indexed "Fever, puerperal").

Rabies (Hydrophobia), in Michigan in, 1907 212-215
  newspaper article relative to treatment of 213-215
  official public notice relative to the restriction of 212
  what to do with animals supposed to be rabid 213
Reading, examination of plans for new school building at 48

St. Louis, inspection of school buildings at 38-39
Sanitary engineering, work in division of 37-52
Scabies (indexed "Itch").
Scarlet fever (indexed "Fever, scarlet").
Schoolhouse, advice relative to the construction of dry earth closets for 42
School rooms, advice relative to overcrowding in 42-44
  work, (see "Board of Health, State").
Smallpox, in Michigan, general prevalence of 194-196
    geographical distribution of 196-198
    in 1907 and preceding years 194-208
    prevalence of in urban and rural localities 198-200
    restrictive and preventive measures in 205-208
    sources of contagium in 201
    spread from one locality to another 202-205
Sputa, particulars relative to collection and mailing of 55-57
State Asylum, examination of plans for new women's building at 20-21
  Board of Health (indexed "Board of Health, State").
  Industrial School for Boys, examination of plans for a new chapel at 13
  Sanatorium for Tuberculosis, examination of plans for new buildings at 14-16, 17, 27-28
    statement relative to establishment of 82-86

Tetanus (Lock-jaw), in Michigan in 1907 210-211
Throat swabs, particulars relative to collecting and mailing of 59-61
Tuberculosis, in Michigan, bacteriological diagnosis of 121
    civil condition of patients 116
    duration of sickness in 118
    general prevalence of 106-108
    geographical distribution of 108-110
    in 1907 and preceding years 106-121
    influence of age and sex in 115-116
    influence of color in 116
    influence of occupation in 117
    location of the disease in cases of 113
    predisposing influences and premonitory symptoms in 114-115
    restrictive and preventive measures in 118-120
    seasonal fatality of 112-113
    sources of contagium in 114

Page.

Tuberculosis, Michigan association for prevention and relief of . . . 86
    particulars relative to bacteriological diagnosis of . . . 55-57
Typhoid fever (indexed "Fever, typhoid").

Upper Peninsula Hospital for Insane, plans for new building at . . . 16-17

Vaccination (see restrictive and preventive measures in "Smallpox").
Varicella (indexed "Chicken-pox").

Water, form of report for sanitary analysis of . . . 70
    particulars relative to collecting and sending samples for analysis . . . 68-69
    potable . . . 66-68
    record card for sanitary examination of . . . 71
Whooping-cough, in Michigan, general prevalence of . . . 161-162
    geographical distribution of . . . 162-164
    in 1907 and preceding years . . . 164-166
    restrictive and preventive measures in . . . 166
    sources of contagium in . . . 165-166
    spread from one locality to another . . . 165
Widal's test, directions for collection for . . . 64-65